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AN EDUCATIONAL IDEAL

Before the late war the great majority of our schools in this country had practically accepted the Prussian ideal as the goal of educational endeavor. Efficiency was the watchword. The pupil must be helped by every available means to a mastery of the laws of nature. Nor was this mastery to remain a thing of the intellect alone: he must be made thoroughly familiar with nature's laws to the end that he might control them so as to widen his dominion over nature. The successful pursuit of this ideal gave Germany her supremacy in commerce and manufacture. We envied her and seemed ready to turn all our resources to account in the struggle to emulate her.

But a change has come over our dreams. The war has shocked us, and while we are still bewildered about many things, including the high cost of living, a disturbed exchange, and labor problems which seem to threaten our commercial future, we have ceased to be certain that our former ideal of education was correct. The war seemed to demonstrate that the end of such an ideal must inevitably be calamity. And so we are asking ourselves what was wrong with our educational system, and where are we to look for the remedy? We feel that this implies a great work of readjustment throughout the whole educational procedure, but evidently the first step must be a thorough examination of our educational ideal. Was it valid? If not, what must be substituted for it?

The Catholic Church has never accepted the Prussian ideal of efficiency in the conquest of nature as a legitimate educational ideal. Over against fact-worship, she has ever maintained that man's spiritual nature demands an ultimate aim in

education that transcends all material phenomena. And while she leads her children, and has led them successfully in the past, to the conquest of nature, she has never ceased to impress upon them that the chief value of such conquest was to be found in the revelation which it furnished of higher things. For her, the chief value of every fact and of every law of nature consists, not in the utilization of the fact and the law to minister to man's physical needs, but in their sacramental character which brought within man's reach knowledge of spiritual phenomena and eternal truths.

No one in our midst has more eloquently voiced the need of this change in the objects of our pursuit than Dr. Ralph Adams Cram. His message seemed to us so important that we published in the September REVIEW his splendid paper on "The Philosophical Necessity," where he sets forth in unmistakable terms the meaning of sacramentalism and the Church's changeless support of this doctrine. The reader is referred to that article for a fuller exposition of the ideal before us. But Dr. Cram has not confined himself to this one article in his endeavor to reach his public and to bring to them the realization of the necessity of this change in our ideal. We commend to our disturbed educators a careful study of his recent books and in particular his "Walled Towns," which was published by Marshall Jones Company, Boston, last November, in which they will find a definite statement of Dr. Cram's educational ideal.

Before proceeding to quote a typical passage from "Walled Towns," it may be well to consider briefly the sharp contrast between fact-worship and sacramentalism, which has been the constant theme of Dr. Cram's recent utterances.

In the early Christian centuries parchment was used instead of paper in the making of books and in the course of time parchment became scarce and costly, even more costly than paper is in the present disturbed times. Now, it so happened that books written in a language that was no longer understood were often used as a source of supply for writers who had not sufficient education to appreciate the content of the precious volumes. In the closing decades of the last century many ancient documents were discovered by the camera on

parchment books which had thus been re-used. The original writing was expunged and no trace of it appeared to the naked eye for centuries, but when photographing the page the camera brought out the ancient legend. In this manner a precious early manuscript of the New Testament was found in the library of a monastery on Mount Sinai; it is known as the *"Codex Siniaticus."* Some ignorant writer in the ninth century had removed the sacred record which he could not understand or appreciate from the parchment which he employed to transmit his own trivial messages. The world condemned this man, not so much for any supposed profanity as for his profound ignorance. He probably was unable to translate a single word of the sacred text and therefore had no concept whatever of its value.

The meaning of this parable is obvious. Our modern fact-worshipers, in their study of the facts and laws of nature, fail to comprehend a single word of the sublime messages which the Creator Himself has inscribed upon them. In nature they see only facts and laws which may be bent to their trivial purposes of ministering to man's material needs. They suggest the state of mind of a child awakening in the morning and crowing with delight at the fragment of a rainbow reflected on the wall of his room from the beveled edge of a plate glass mirror. But there is this difference between the child and the fact-worshiper: the latter has grown old in his conceit and he is dogmatically certain that there is nothing in natural phenomena other than the object of his pursuit. The child, on the contrary, is thrilled with delight at the flashing fragment of a rainbow. It is true that he has no suspicion of the message that this spectrum will later on bring to him when, as a physicist, he examines the various bands which it contains and from them reads the message from the sun or from the distant star.

Our Saviour, in delivering His sublime messages of supernatural truth, constantly used nature as a mirror in which His followers were taught to see the intangible things of the supernatural world. We are told that He taught the multitudes in parables and without parables He did not teach them. "Consider the lilies, how they grow: they toil not, neither do

they spin. But I say to you, not even Solomon in all his glory was arrayed as one of these." The growing lilies were probably in evidence in the fields as Our Saviour thus discoursed, but His object was not to instruct His followers in botany. It is true that He invites them to consider the lilies and the method of their growth, but we are at once made aware of the fact that He centers the attention of His auditors on the Providence of God as reflected in the life of this lowly plant, for He proceeds: "Now, if God clothed in this manner the grass that is today in the field, and tomorrow is cast into the oven; how much more you, O ye of little faith?" A little further on Our Saviour teaches the same truth, using the paternal instinct as the mirror: "Or what man is there among you, of whom if his son shall ask bread, will he reach him a stone? Or if he shall ask him a fish, will he reach him a serpent? If you, then, being evil, know how to give good gifts to your children: how much more will your Father Who is in Heaven give good things to them that ask Him?" The teaching of psychology is here incidental; the real lesson is the mirrored truth. It is the sacramental aspects of botany and psychology that are seen to possess supreme value.

The people of the Middle Ages understood this method of teaching and employed it universally. Vincent of Beauvais wrote "The Mirror of Nature," "The Mirror of Instruction," "The Mirror of Morals." "The Mirror of History," which included the Old and the New Testament. The teachings of these mirrors and their method was embodied in all the arts of the time and assembled in the great cathedrals, reaching their culmination in the sacred ceremonies of the Liturgy. Unfortunately, the fourteenth century brought a change. The meditations of the Pseudo-Bonaventure were dramatized in the Miracle Plays and copied by the art of the fourteenth, fifteenth and sixteenth centuries. The sacramental sense was gradually lost in the appeal to the senses and the emotions. Supernatural truth lost its clarity and compelling force, while the present world more and more absorbed the attention of man and led him into the various abuses which culminated in the so-called Reformation. This change in the teaching and practice of Christian art deserves very careful study by our educators in their present bewilderment. From it they

will learn something of the value of the symbolic in education and something of the great loss the Christian world sustained when this principle was abandoned for the principle of mere utility. Dr. Cram has proved his right to a respectful hearing in this field, and the educator can scarcely do better than to begin his search for the right ideal by a careful study of what Dr. Cram has to offer.

"Walled Towns" opens with a striking contrast between the world as it existed at the opening of the fourteenth century and the world as it existed at the close of the nineteenth century. One is full of beauty and joy and peace and cleanliness, the other is the filthy product of utilitarian civilization. One cannot read this Prologue without feeling keenly the need of a new Renaissance. Not the Renaissance of Pagan Greece and Rome, but the rebirth of the civilization which culminated at the close of the thirteenth century. The closing chapters of the book are devoted to an ideal sketch of a civilization in the future that is the outgrowth of a deliberate opposition to nineteenth century democracy and to nineteenth century civilization. "It will be evident at once that the Walled Towns are founded in deliberate opposition to nineteenth century democracy as well as to its bastard issue, its Mordred and its Nemesis, anarchy and Bolshevism, and to its inevitable but blood-kin enemy, socialism. Through state socialism, communism or internationalism a foolhardy and illiterate democracy, surrendering at discretion to the materialism of industrial civilization, has striven to maintain the thing itself in all its integrity and its wealth-producing potency while turning its products into the hands of the many rather than the few. Even now, with the myrrh of war still bitter on the lips, the dim visions of greater things are fading away, and only one cry goes up for ever greater production, for more intensive effort, in order that the material losses may be retrieved."[1]

In the concrete picture which Dr. Cram sketches of a typical walled town of the future, Beaulieu, he gives a brief outline of the educational system which it maintains. We quote the passage in full.

[1] Walled Towns, p. 96.

"Within the Walled Towns the educational system shows few points of resemblance to the standards and methods still pursued outside. It is universally recognized that the prime object of all education is the development of inherent character, and for this reason it is never divorced from religion; the idea of a rigidly secularized education is abhorrent, and the dwellers in the Walled Towns rightly attribute to its prevalence in the nineteenth century much of the retrogression in character, loss of sound standards of value, and the disappearance of leadership which synchronized with the twentieth century breakdown of civilization even if it were not indeed its primary cause. Neither is there any false estimate of the possibilities of education; it is held that while it can measurably develop qualities latent in the child by reason of his racial impulse, it cannot put in what is not there already. The old superstition that education and environment were omnipotent, and that they were the safeguards as well as the justification of democracy, since given an identical environment and equal educational opportunities an hundred children of as many classes, races and antecedents would turn out equal as potential members of a free society, has long since been abandoned. It is impossible to enter into this question at length, but the chief points are these.

"Education is not compulsory, but parents are bound to see that their children can 'read, write and cipher.' Primary schools are maintained by the town and are conducted largely along the lines first developed by Dr. Thomas Edward Shields in the early twentieth century. Beyond primary grades the schools are maintained by various units such as the guilds, the parish and the monasteries and convents. While considerable variation exists as between one school and another, they are all under the supervision of the Director of Education in order that certain standards may be maintained. Variety both in subjects taught and in methods followed is held to be most desirable, and complete freedom of choice exists between the schools, though a parent wishing to send a child to some school other than those maintained by his own guild pays an annual fee for the privilege. Beyond reading, writing, arithmetic and music, which are common to all, the curriculum varies widely, though history, literature and Latin are practically universal. In some schools mathematics will be carried further than in others, in some natural science, while elsewhere literature, history, modern languages will be emphasized. There is no effort to subject all children to the same methods and to force them to follow the same courses—quite the reverse; neither is the object the carrying of all children through the same schools to the same point. It is held that beyond

a certain stage most children profit little or nothing by intensive study. On the other hand, there are always those whose desires and capacities would carry them to the limit. These are watched for with the most jealous care, and if a boy or girl shows special aptitude along any particular line he becomes an honor student, and thereafter he is in a sense a ward of the community, being sent without charge to the higher schools, the college, and even on occasion to some university beyond the limits of the Walled Town if he can gain there something not available within the walls. Of course any student may continue as far as he likes, or is able, but this is not encouraged except in the case of the honor student, and he must himself meet his own expenses. The authorities are particularly careful to discover any special ability in any of the arts, literature and philosophy, and it is the boast of the Walled Towns that no one who gives promise along any one of these lines need fail of achievement through lack of opportunity. In the case of the various crafts also the same care is exercised, and a boy showing particular aptitude is at once given the opportunity of entrance into the proper guild as an apprentice, after he has been prepared for this by a modified course of instruction adapted to his particular ability.

"The college has something the effect of the blending of New College, Oxford, and St. John's, Cambridge. It is perhaps the most beautiful element in the Walled Town, and here every intellectual, spiritual and artistic quality is fostered to the fullest degree. The college is a corporation under control of the alumni and the faculty, and not in the hands of trustees, as was the unfortunate fashion amongst American universities in the nineteenth century. There are many fellowships granted for notable achievements along many lines, and a Fellow may claim free food and lodgings for life, if he choose, the return being certain service of a limited nature in the line of instruction, either as lecturer or preceptor. A few students are received from without the walls, but the number may not exceed five per cent of the student body, and high fees are charged for the privilege. There are no regular courses divided into four years. An honor student must take his Bachelor's degree within six years, his Master's degree in not less than two years thereafter, and his Doctorate in another four years, otherwise his privilege lapses, and he must pay as other students, in which case there are no limits whatever and a man may spend a lifetime in study if he desires—and can pay the price. All the regular members of the faculty must be burgesses, but many lecture courses are given by visiting professors from all parts of the world. Latin is a prerequisite

for the Bachelor's and Master's degrees, and Greek for the Doctorate, whatever the line that may be followed."[2]

If it be objected that this educational system, however beautiful in itself, would not fit into our present situation, I believe Dr. Cram would be the first to say Amen. He sketches an educational system which is admirably adapted to the needs of Beaulieu, but the fortunate denizens of that Walled Town seem almost as far removed from the unfortunate victims of the industrial civilization of our day as are the angels or, at least, as were the dwellers in the walled towns of the thirteenth century. But for all that, it is not the part of wisdom to look upon this educational ideal as a merely beautiful dream that has no practical value for us situated as we are. To adopt this procedure would be to incur the condemnation of the Saviour, who compared such an one to a man who looketh upon himself in a mirror and presently going away forgetteth what manner of man he was. Here as elsewhere the ideal is the thing of supreme value since it determines the direction in which we must turn our faces and it fixes the goal towards which we must strive unceasingly.

Of course education is not and from the very nature of the case never can be a thing apart. It is but a means to an end and that end is the perfecting of the individual and the perfecting of the civilization of which he forms a part. We cannot, therefore, reach perfection in our educational work without profoundly modifying the current civilization, nor can we ever proceed far in the task of perfecting our civilization unless we perfect our educational system to upbuild and sustain every advance in civilization. In Beaulieu, Dr. Cram sketches an ideal civilization together with a suitable educational system.

If the ideal is to have practical value for us, we must endeavor to find those elements in our present educational system which give most promise of assistance in the right direction, and by gradually developing these we will inevitably react upon economic and social conditions in such a manner as to permit and to justify still further developments in the direction of the educational ideal.

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[2]Walled Towns, pp. 83-87.

In the opening paragraph of Dr. Cram's sketch we see that in the Walled Towns "the prime object of all education is the development of inherent character, and for this reason it is never divorced from religion, etc." Now the religious conditions of this country continue to present the same difficulty that was encountered by Horace Mann at the beginning of our public school system. A multitude of warring religious sects still continue their irreconcilable contentions, and as each has equal right in a school maintained from the public treasury, it is not easy to see how religion may be made the basis of the work in our public schools. The Walled Towns sketched by Dr. Cram avoid this difficulty by congregating in each town citizens professing the same religion. Were it possible for us to do this, we might avoid this difficulty as well as many others, but I greatly fear that we are not near this condition at present and, if we ever reach it, it will be after we of the present generation are gathered to our fathers. But where we have schools maintained by any one religious denomination we can and should be very thorough in our acceptance and practical carrying out of Dr. Cram's recommendations. The whole curriculum and all our methods in such schools should be recast so as to make religion the vital center of our work and we should banish "rigidly secularized education," which should be as abhorrent to us as to the dwellers in the Walled Towns. It is only in this way that we may hope to escape "the retrogression in character, the loss of sound standards of value, and the disappearance of leadership which synchronized with the twentieth century breakdown of civilization even if it were not indeed its primary cause."

Whether we agree with Dr. Cram or not concerning the relative importance of heredity and environment in determining the educational possibilities of the child, we can scarcely escape the validity of his contention that the welfare of a democracy demands an elementary education for all and the highest possible development for those who are fitted by nature to become leaders in the various lines of progress. It is too often taken for granted that educational advantages in a democracy must be utilized for the greatest good of the greatest number. Very little consideration will suffice to show

the fallacy of this principle. In a democracy majorities may safely be trusted to take care of themselves: it is the minority that need protection. Government for the good of the majority leads straightway to the jungle with its bestial struggle for existence and survival of the strong. Christian civilization puts equity on the throne and banishes might. The axiom should evidently read: for the greatest good of the whole body and this demands the highest possible development of the few who are destined to lead us out of bondage and to keep us out of trouble. Our present educational system aims at providing equal opportunities for all and this must inevitably lead to the acceptance of mediocrity as a standard and to retrogression of the whole body. It should not be impossible to carry out Dr. Cram's idea even in our present circumstances. In the days when the Church controlled education, there were numerous foundations of scholarships and fellowships for those who proved themselves worthy, and the practice has not yet wholly died out in some of our institutions.

For many years the trend in our public school system has been to remove control of education from the home and from the local community and vest it in school boards and in educational experts who are not subject to the will of parents. This is defended on the plea of better system and greater unity. But to deprive the school of the intimate relationship with the home which is essential to the right formation of character is to rob it of its best influence and to dehumanize it. We may not in the near future witness a return to the guild system with each guild supporting and controlling its own school, but we would do well to be warned against the present tendency towards depriving even the several sovereign states of the control of their own schools. It is high time that we face about and seek to restore to the natural groups of our citizens the control of their children's development, of which they have been unwisely and unjustly deprived. But perhaps the most striking departure from wisdom in our educational procedure is hinted at in the paragraph dealing with the control of college education. "The college is a corporation under control of the alumni and the faculty, not in the hands of trustees, as was the unfortunate fashion among American universities in the nineteenth century." As a matter of fact, the college

does not seem to have suffered from excessive trustee control as much as elementary schools. The faculties of our great colleges and universities for the most part are listened to respectfully when they make recommendations concerning ideals and methods to be pursued, but the great body of teachers in our elementary schools has ceased to exert any noticeable influence on the conduct of elementary education. Public school boards and superintendents seem to have borrowed their ideals of control from trusts and corporations; they seem to be mortally afraid of their not getting as much work out of the teachers as is possible and they take it for granted that the teachers work only for their salaries and have no real interests in common with their pupils. This attitude on the part of those controlling our public schools has done and is doing incalculable harm. The teacher who is really the first one who should be listened to seldom has any voice in the control of the school.

Of course standards must be maintained and this is not possible without system, but there are two kinds of system: in the one all initiative and all control arises from the central authority; this is the type we are protesting against because it is inconsistent with human nature and can never lead to real progress; the other maintains a central control, but encourages initiative in each individual. Perhaps the best concrete illustration of this method of control is to be found in the Catholic Church. Supreme control rests with the Holy See, but the initiative remains with the people and clergy throughout the world. The Church has never founded a religious order or congregation, but when some group of individuals sees the possibility of accomplishing a great work in this way, they organize a little group of workers and with the permission of their superiors begin their work. If it proceeds along wholesome lines and proves of value, the Holy See will in time accept its work and examine and confirm its rules. Thus it has been in all lines of Catholic activity and in this respect the Church stands out in marked contrast with the control which organized capital has sought to exercise in the field of human industry and which is proving so troublesome in our own day.

THOMAS EDWARD SHIELDS.

THE CORRELATION OF RELIGION WITH ELEMENTARY PLANE GEOMETRY*

By Sister M. Callixta, C.D.P.

I. THE UNDERLYING PRINCIPLE

Mental growth is a vital growth. All vital growth proceeds by intussusception,[1] and for the mind this process demands a simultaneous, progressive unfolding of all the powers of the soul, and the functional interrelation of all its activities. To further this organic growth and development, all educators today are agreed that the whole mental life in its cognitive and conative aspects, together with their motor responses, must be carried forward simultaneously, and this demands correlation. The entire mental content must be woven together into one organic unit, and "In the name of this principle, the teacher insists that each new thought element taken into the mind shall be so related to the previous mental content as to shed its light upon every item of previously assimilated knowledge, and that in turn it shall be illumined and rendered intelligible by the light which falls upon it from each truth that holds a place in the structure of the growing mind."[2]

"Previous mental content" here evidently means more than cognitive content; it embraces the whole volitional and emotional content as well. The principle seeks not only the interlacing of the various topics of any one subject, but also the interpenetration of the various topics of the various subjects, and the bringing to bear of this unified whole upon the entire life of the individual. The isolation of any one subject, or of any one power of the soul, must, according to modern psychological laws, prove detrimental not only to the segregated subject or faculty, but to the life and fulness of the other powers, and to the organic unity of the mental content.

*A thesis submitted to the Catholic University in partial fulfillment of the degree Master of Arts.

[1]Cf. Shields, T. E., "Philosophy of Education." Washington, D. C., 1917, p. 101.

[2]Shields, T. E., "Teachers' Manual of Prim. Meth." Washington, D. C., 1912, p. 95.

Isolated knowledge cannot be readily used, whereas organized knowledge can, and this ready use reacts upon the will, making it more confident and self-reliant and thus fostering strength and decision of character.

This principle of correlation, axiomatic as it now is, at least in theory, for all good teaching, needs no further amplification save to say that the same reasons that demand the correlation of the secular branches one with another, far more emphatically demand, according to our Catholic ideals of education, the correlation of all the school subjects with religion as their natural core and unifying agency. The *raison d'être* of Catholic schools is the teaching of religion, not in abstract formulae, but in such a way as to make it penetrate the whole life of the pupils. The unfolding mind must perceive the natural and the supernatural in their true relations; it must pass from the concrete and material to the abstract and spiritual; it must learn to "look not at the things which are seen, but at the things which are not seen."[3] Catholic educators know that "Here below man can know God only by analogy,"[4] and they know too that "if religion is to be anything more than a vesture to be put on for a brief hour on Sunday and laid aside whenever the performance of any of those duties which constitute the warp and woof of our daily life is undertaken, it must be taught to the child as it really is, that is, as something inseparable from the rest of life. The child must find in religion the beginning and the end of all that is known and of all that may be desired on earth or in Heaven.

"This intimate correlation between the truths of religion and the truths of science, between our duties to God and our duties to our fellow-man, must not be lost sight of in any stage of the educational process"[5] and must find a place with every item of knowledge presented to the child. In teaching religion as such, illustrations, analogies, and symbols of spiritual truths are to be drawn from nature, from art, from history, from literature, from personal experience; so, too, in the teaching of the other branches of the curriculum, religious

[3] II Cor. iv, 18.
[4] Pohle-Preuss, "God." St. Louis, 1911, p. 15.
[5] Shields, T. E., "The Teaching of Religion." Washington, D. C., pp. 107-108.

truths are to be introduced whenever possible. In this way, the teacher teaches religion all day long, while she shifts the emphasis from one branch to another.

This statement logically leads to an inquiry into the precise meaning we attach to the word Religion. St. Thomas says: "Religion is the virtue by which man shows God the worship and reverence due to Him."[6] Evidently then we do not mean only, nor even mainly, dogma; nor de we mean external ceremony only, nor mere feeling. Religion means all this taken together; it means *living* for God; it means essentially both believing and doing; it means shaping one's life in accordance with the law of God. To secure this sort of religion in the hearts of the children, we maintain that "religion shall pulsate like a vital stream through every part of our course of education, and shall vitalize every element there; and while it stoops down to accommodate itself to the needs of the little child, it shall gently and gradually lift the mind, the thought, the will of the child beyond the present range of things, beyond the horizon that we survey with our eyes, to a higher world, to a world where dwells that God who is the fundamental unity, but something more; who is the power that makes for righteousness, but also the power that defines what righteousness is; who is, if you please, the Author of this scheme of things which we call the universe, and who reveals Himself alike in the circling orbs that we survey in the firmament and in the eyes of the child that sits before us in our Catholic schools."[7]

With the extensive growth of knowledge and the almost endless ramifications of each branch of learning, it is indeed not always clear that there are points of contact between religion and any one given subject in the school curriculum. It is probably safe to say, in the absence of statistical evidence, that the majority of high-school pupils see very few, if any, points of connection between their religious study and their mathematical study. This paper purports to be an investigation into the possibility of establishing at least some such

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[6]Summa II-II 2. lxxxi a.

[7]Pace, E. A., Proc. of C. E. A. 1911, p. 104.

interrelationship, both in method and content, as the high-school pupil can grasp, between religion and elementary plane geometry. It excludes all reference to non-euclidean geometry, not indeed that it is thought antagonistic to religion, or to the unchangeableness of truth, but because normally it has no legitimate place in the high school. The teacher evidently will find a breadth of view and a source of inspiration in its study, as also in the study of the foundations of geometry, but these things are not for beginners, if they are to find an intellectual interest in the study and an appreciation of its many bearings on life.

II. HISTORICAL RETROSPECT

A wide-ranging search into the literature bearing on elementary plane geometry, and on mathematics generally, made it evident that very little correlation with religion had been made. It is true that numbers, regarded as sacred, have played an important role in the philosophical and mystical writings of some of the ancient pagans, and also of some of the early Fathers of the Church.[8] Geometrical concepts were also utilized for philosophical illustrations, as may be seen, for instance, in Plato's Republic and Dialogues.

St. Augustine (354-430) uses similar illustrations in his search for a knowledge of God and the soul. From the Soliloquia[9] we learn that he desires to know nothing else; moreover, that he knows nothing as he wishes to know God, for if he did, he would love it, but he loves nothing else but God and the human soul, neither of which he knows. It is not enough for him to know God as he knows things, through the testimony of his senses, nor yet as Plato and Plotinus knew Him. Then turning to geometry, he admits that he knows well what a line is, and does not fear having been deceived by the Academicians. But even as he knows a line does he know a sphere, and he knows them not through the senses but the intellect, although the senses seem to help the learner somewhat at first. "Wherefore it seems to me that one could more easily sail on land, than learn geometry by means of the

[8] Cf. Cath. Encyl., Vol. XI, p. 151.
[9] Migne, t. 32, col. 869-904.

senses."[10] He recognizes that the nature of a line is quite different from that of a sphere, and yet that the nature of the knowledge of the two is the same (indifferens), for he knows the one in the same way that he knows the other. It seems to him then, that he should wish to know God as he knows geometry, that is, without doubting anything about either. Yet he hesitates to admit that, "For," says he, "not only the subject-matter but the very knowledge of both seems to me to be different. In the first place, a line and a sphere are not so different from each other, that one science cannot contain both; but no geometrician professes to teach theodicy. Moveover, if the knowledge of God and of geometry were on a par, I would rejoice as much in knowing geometry as I presume I shall rejoice once I know God. Now, however, in comparison with knowledge of God I so greatly contemn knowledge of geometry, that sometimes it seems to me that if I knew Him as I see He can be known, I should quite forget my knowledge of geometry. Since, indeed, in the presence of His love the thought of geometry scarcely comes to my mind."[11] This difference, however, he is soon led to see, is due to the difference of the *object* known and not to a difference in the manner of knowing. "And I am led to acknowledge, that in its own field, as far as the earth differs from heaven, so far do those true and definite proofs of science differ from the intelligible majesty of God."[12]

Although St. Augustine rightly says that the geometrician does not teach theodicy (Deum), yet he knows well how serviceable geometrical figures and concepts may be, to lead the soul to a clearer grasp of spiritual truths. When he speaks of the human soul which is "similis Deo,"[13] it is from the geometrician's field that he draws some of his earliest illustrations. After stripping the soul of every notion of length and breadth—of extension, he shows its exceedingly great power in forming "magnae imagines"[14] and abstract ideas,

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[10] *Op. cit.*, col. 874.
[11] *Op. cit.*, col. 875.
[12] *Op. cit.*, col. 875.
[13] De Quantitate Animae. Migne, t. 32, col. 1037.
[14] *Op. cit.*, col. 1040.

as for instance of "longitudo mera et simplex."[15] This intellectual concept of a line leads him into an explanation of figures and the formation of triangles and quadrilaterals. Those formed by equal lines are more beautiful than those formed by unequal lines. In an equilateral triangle all the angles are invariably equal, but just as invariably do the sides lie opposite the angles. In the equilateral parallelogram, if all four angles are not equal, at least the opposite angles are equal. In this respect the equilateral triangle possesses greater equality than the parallelogram; but, on the other hand, the parallelogram has more equality in this, that the sides lie opposite sides, and the angles opposite angles.

These considerations impressed St. Augustine deeply, for in these relations and distinctions, he sees symbolized the virtue of justice: "We say, methinks, that justice is nothing but equity. Equity, however, seems to have been derived from a certain equality. But what is the equity in this virtue, except that to everyone that is given which belongs to him? Moreover, what belongs to each one cannot be given him, unless there be some distinction. Do you think there is any distinction, if all things are equal and do not differ at all from one another. E. By no means. A. Therefore justice cannot be, unless there is, as I have said, some inequality and difference in those matters in which it is found."[16]

In this comparison between equality in figures and equity, St. Augustine finds joy and seeks the figure which contains perfect equality. The two figures so far considered contain some degree of equality, but not "summam aequalitatem."[17] The first point of inequality is the great difference that exists between an angle and a line, and the second is the fact that lines drawn from the center of the figures are not equal, for those drawn to the angles must needs be longer than those drawn to the sides. Both these breaks in equality, the circle eliminates. In the first place, no angle breaks in upon the continuous uniformity of its perimeter, and in the second place, its center is equally distant from all parts of the circumference. The circle, therefore, must be preferred to all

[15] *Op. cit.*, col. 1041.
[16] *Op. cit.*, col. 1043.
[17] *Op. cit.*, col. 1044.

other plane figures on account of its perfect equality, and the measure of that equality is the point fixed in the center. His idea of a point, he compares with his ideas of length, breadth, and height, and shows that that which is least susceptible to division into parts, is the most excellent and contains the greatest potentialities. In this respect, length is more excellent than width and height, but the point surpasses all three in simplicity and in potentiality, whether it holds the center of a figure—"punctum,"[18] or marks the inception or termination of a line—"signum."[19] The point admits of no division, and its powers are manifold. A line begins at a point, it ends at a point, it is cut at a point, it meets another line at a point; a point is the measure of the equality of a figure; it is necessary for the very existence of length, while it exists "per semetipsum"[20] and needs neither length nor width. But such true lines, and such true widths, and such true points, cannot be seen with bodily eyes. Hence the soul with which we do see such incorporeal things must likewise be incorporeal. It is composed of no elements, it has no quantity, but it is "a certain substance endowed with reason, well fit to rule the body."[21] But though the soul has no quantity it can know things of the heavens, the earth, and the sea, which have quantity and occupy space. "For, if there is no material substance, as reason has already shown, that is without length, breadth and height, none of which can exist in a material substance apart from the other two, and if, nevertheless, it is a property of the soul to see a line (mere length) merely by means of what we may call an interior eye, that is by means of the intellect, I think that it is beyond doubt that we admit that the soul is not a material substance; nay, it is better than a material substance. This being granted, I do not think it will be doubted that it is also better than a line. For it is ridiculous to suppose that the soul, which is better than matter, is not better than any one of the three things

[18] *Op cit.*, col. 1046.
[19] *Op. cit.*, col 1046.
[20] *Op. cit.*, col. 1046.
[21] *Op. cit.*, col. 1048: Substantia quaetam rationis particeps, regendo corpori accommodata.

essential to matter. But the line itself, than which the soul is proved to be nobler, excels the other two properties of matter because it can be resolved less than they. They can be resolved more than a line, in as much as they extend more in space. Whereas, a line has no dimension save length, and, if that be eliminated, no space whatever remains. Hence whatever is better than a line is necessarily without space and incapable of being divided and resolved. To no purpose, therefore, it seems to me, do we labor to find the quantity of the soul; since it does not exist, since we have proved the soul superior to a line. And, if of all plane figures, the circle is the most excellent—reason showing its whole essence and perfection to lie in a point, which, everybody admits, is unity—what wonder if the soul is not corporeal, neither extended in length, nor stretched out in width, nor solidified in height, and yet is so powerful in the body that it is the governing principle of all the members, and, as it were, the very hinge in the activity of all bodily members?"[22]

These few passages from the writings of St. Augustine are very suggestive and will be somewhat amplified in a later section of this paper. Not only is the content illustrative of the correlation which we seek to establish between religion and elementary plane geometry, but the very method of procedure may well serve as a lesson to the geometry teacher. Both the Soliloquia and the De Quantitate Animae are cast into dialogue form, and though St. Augustine may seem rather circuitous to the adult reader, he proves himself the real teacher who leads his pupils to think along with him, and when they err, he leads them by means of questions, to a recognition of the truth, and the abandonment of their mistaken views.

The work on geometry most influential[23] during the early Middle Ages, Boethii Quae fertur Geometria,[24] bears no trace of interrelationship with religious or moral truth.

In the tenth century, Gerbert, the monk of Aurillac, later known as Pope Sylvester II, won for himself the title of magician, owing to his inventive genius in the teaching of

[22] *Op. cit.*, col. 1048.

[23] *Op. cit.*, col. 1048: Substantia quaedam rationis particeps, regendo 1901, p. 139.

[24] Ed. Friedlein. Leipzig, 1867.

mathematics.[25] In 994 A. D., King Otho III, then fifteen years of age, invited Gerbert to come to the imperial court to teach him the "science of numbers"[26] and to join the flame of his culture to the spark possessed by the Saxons. The Geometria, now established to be authentic,[27] contains the following statement in the introduction: "Indeed, the utility of this study is the greatest possible to all lovers of wisdom. Because first, it is the science most fitted to rouse and develop the powers of mind and soul, and to sharpen the reasoning faculty; second, it yields most satisfaction, by its definite and reliable methods, in tracking the countless truths that to many appear astonishing and beyond belief; third, it is most fertile in keen speculation for the study, admiration, and praise of nature's forces and its Creator's power and unspeakable wisdom which has arranged all things in keeping with their number, weight and measure. From every possible source, we are going to bring together, as far as our little talent will permit, some notions about the methods and rules of geometry, to the end that in orderly fashion we may lead beginners in the science to more subtle propositions. So, we begin at the very elements of the art—what philosophers call the (first) principles."[28]

This passage indicates, at least, that Gerbert recognized in geometry the power of presenting to the thinking mind a mirror of the Creator, the Framer of mathematical law as well as of the laws of the physical sciences into some of which one can scarcely enter without some knowledge of geometry. However, besides the bare statement given after an explanation of the right angle: "This, however, as if acting the part of virtue in holding the mean, always and uniformly equal, neither expands more nor less than is lawful."[29] there is no other indication in the work of Gerbert of that mirror. This by no means proves that he did not unveil that mirror

[25] Cf. *Cath. Univ. Bulletin*, Vol. 4, 1898, p. 301.
[26] *Dublin Review*, Vol. VI, 1839, p. 295.
[27] Cf. Cantor M. Geschichtei d. Math. Leipzig, 1880, vol. I. pp. 743-751.
[28] "Gerberti . . . Opera mathematica, ed. Bubnov, N. Berlin, 1899, pp. 50-51.
[29] *Op. cit.*, p. 66.

before his pupils in his oral instruction, but only that he has left us no written record of what he saw therein.

In the fifteenth century, we find in the various works of Cardinal Nikolaus of Cusa (1400-1464) an explicit correlation between religion and mathematics. The sources drawn upon for the account here given, are not the original works. These being inaccessible, free use was made of various studies by German scholars, especially those of Uebinger,[30] Clements,[31] Jacobi,[32] Falckenberg[33] and Löb.[34] The quotations from the Cardinal's works were gleaned from Uebinger and Löb.

Uebinger's critical study of the mathematical works of Cusa places them all between the years 1450 and 1458, and divides them into three groups. The first group belongs to the year 1450 and comprises De quadratura circuli, De geometricis transmutationibus, and De arithmeticis complementis. The second group, of 1453-1457, includes De mathematicis complementis, Dialogus de quadratura circuli, and De una recti curvique mensura. The third group, of 1458, includes De beryllo and De mathematica prefectione.[35] Uebinger also shows the changes which the Cardinal's mathematical ideas underwent from 1440 to 1458. At first the infinitely large engaged his attention, and at last he dealt with the infinitely small thus anticipating the Infinitesimal Calculus.[36]

The mystical tendency imbibed from his early teachers, the Brethren of the Common Life,[37] at Deventer, is readily seen in his works. In them, "he insists with special emphasis on the doctrine of the *unity of opposites* (*coincidentia oppositorum*) and on the principle that the beginning of true wisdom is the knowledge of one's own ignorance (*Docta Ignor-*

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[30] Philos. Jarhbu. 1895, 1896, 1897.
[31] Giordano Bruno u. Nic. von Cusa. Bonn, 1847.
[32] Das Universum u. s. Gesetze in d. Lehren K. N. von C. Berlin, 1904.
[33] Aufgabe u. Wesen. d. Erkenntnis bei N. von Kues. Breslau, 1880.
[34] Die Bedeutung d. Math. für d. Erkennt. des N. von K. Berlin, 1907.
[35] Cf. Philos. Jarbu. 185, pp. 403-422; 1896, pp. 54-66, 391-410; 1897, pp. 144-159.
[36] Cf. Uebinger Philos. Jarhbu. 1897, p. 159.
[37] Cf. Grüning G. Wesen u. Auflgabe d. Erkenn, nach N. C. Quedlinburg, 1902, p. 4.

antia)."[38] "His concept of God has been much disputed, and has even been called pantheistic. The context of his writings proves, however, that they are all strictly Christian. Schrapff calls his theology a Thomas à Kempis in philosophical language."[39] His position in Church and State is well summarized by Janssen.[40]

We forego any discussion of Cusa's arithmetical illustrations of supernatural truths, and confine ourselves to the geometrical illustrations. In his Complementum theologicum, the Cardinal states that he feels it incumbent upon him to indicate the value of his mathematical work, the De mathematicis complementis, for theology. "It seems to me not proper," he says, "to circulate that treatise as though a person of my rank and age should be allowed to write about mathematics, without adding its transcendent value for theological likeness."[41] Theology is for Cusa, as for the Middle Ages, the Queen of the Sciences, which all other sciences must serve. How geometry may serve her, he shows in some detail as follows:

God is the Creator of all existing objects and of all forms of nature. Man is the creator of intellectual ideas and of the forms of art; chief among which are mathematical concepts and forms. The intellect of man seeks truth, and Infinite Truth is God, in the quest of Whom the mind of man finds its supreme happiness but the journey to Infinite Truth is likewise infinite, and the unending search, far from fatiguing the mind, arouses it the more, the nearer it approaches the goal where all opposites meet, namely, God. Again the Cardinal says: "But because 'what is' is infinitely removed from 'because it is' it results that the movement will never cease, and it is a most delightful movement because it is towards the life of the mind. And hence the very movement is rest, for in moving it is not fatigued, but is inflamed the more. And the quicker it moves, the more delightfully is it drawn through the light of life to its own life."[42] God, the

[38] Turner W., Hist. of Phil. Boston, 1903, p. 432.
[39] Cath. Encycl. Vol. XI, p. 61.
[40] Geschichte d. Deutsch. Volkes. Freiburg, 1887, p. 3-6.
[41] Uebinger. Philos. Jahrbu. 1896, p. 404.
[42] Löb, p. 14.

Infinite Truth, is incomprehensible, and yet it is God whom Cusa seeks to know through symbols and especially mathematical symbols because of their certainty and unchangeableness: "Since the way of approaching to divine things is not open to us except through symbols, we shall be able to use mathematical symbols more suitably because of their unchangeable exactitude."[43] And again in the Complementum theologicum he says: "No one is ignorant of the fact that in mathematics truth is attained more surely than in the other liberal arts; and for that reason we see those who have gained a liking for geometry adherring to it with an astonishing love."[44] All wise and holy teachers agree that visible things are in truth symbols of invisible things, and that through these symbols we creatures can in a certain measure see our Creator as in a mirror. However, all mathematical figures are finite, and would we use them as symbols for the Infinite "it is necessary first to consider finite mathematical figures with their phenomena and laws";[45] "And to transfer these same laws to fit similar infinite figures";[46] "After this, in the third place, to take over these same laws of infinite figures to the purely infinite, independent even of all form."[47] Cusa tells us that he follows all those who have in various ways used these figures as symbols. St. Anselm compared Infinite Truth to "rectitudini infinitae," and Cardinal Cusa follows that comparison and symbolizes it by an infinite, straight line. Other learned men "have compared a triangle of three equal, right angles to the ever-blessed Trinity."[48] Such a triangle, he explains, must necessarily be an infinite triangle. Others, he continues, who wish to symbolize the absolute unity in God, say that God may be compared to an infinite circle, while those who regard especially absolute existence, the plenitude of Being, in God, compare Him to an infinite sphere. Cusa agrees with each of these comparisons, saying that each is an apt illustration and that they all ultimately proceed from the

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[43] Philos. Jahrbu. 1895, p. 313.
[44] Löb, p. 42.
[45] Philos. Jahrbu. 1895, p. 313.
[46] *Op. cit.*, p. 313.
[47] *Op. cit.*, p. 314.
[48] *Op. cit.*, p. 314.

same idea. For were a line infinite, it would also be a triangle, a circle, and a sphere; and were a sphere infinite, it would likewise be a triangle, a circle, and a line. This statement becomes intelligible when we accept the further statement that whatever is in a finite line potentially, is in an infinite line actually.[49]

Since the infinite line is to be regarded as a symbol of God, and since the potentialities of a finite line are actualities for the infinite line, we must try to discover these potentialities. First of all, Cardinal Nikolaus tells us, the less the curvature of the circle, the greater is the circle. Hence the circumference of the very greatest circle is the least curved or the nearest to being straight.[50] Here, as in the Absolute Greatest, that is God, we see that opposites meet. A second illustration of God's infinity in whom all opposites meet, is found in the infinite straight line. Any given finite line can be longer and straighter than it is; not so the infinite line, for it is infinitely long and perfectly straight. Moreover, if any given line, ab, is moved until point b reaches point c, while point a remains fixed, a triangle is formed. If the line ab is moved again, point a remaining stationary, until b returns to its starting point, a circle is described. If it is moved until b lies opposite its original position, that is at d, a semi-circle is formed and lines ab and ad form one continuous line. Now if this diameter, bd, remains stationary and the semi-circle is moved about it, a sphere is described. All these potentialities, the triangle, the circle, and the sphere, of a finite line, are actualities in the infinite line.[51] And just as the line is the principle of all figures, so is God the principle of all creation.[52] Of all the figures, the circle is the simplest and can therefore be regarded as the measure of the other figures. But the infinite circle itself is measured by an infinite line, which, as was shown above, coincides with the infinite circle. As the infinite figure can never be measured by the finite figure, so neither can God be measured or comprehended, but He is the measure of Himself and of all things.[53]

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[49] *Op. cit.*, p. 315.
[50] Cf. Löb. pp. 59-60. Philos. Jahrbu. 1895, p. 315.
[51] Cf. Philos. Jahrbu. 1895, pp. 315-316.
[52] Cf. Löb, p. 60.
[53] Cf. Löb, p. 60.

As was said above, God is absolute Greatness and admits neither of increase nor decrease. He is pure actuality in whom all opposites meet. He may be represented by an infinite circle.[54] It is a perfect figure or symbol of unity and simplicity. It has an infinite diameter and its center is at infinity. But in an infinite circle, the center, diameter, and circumference coincide, as in an infinite triangle the sides coincide. Now God has freely created the world as an imperfect picture of Himself. He is at once the Efficient, the Formal and the Final Cause of the world. As the Efficient Cause, He is symbolized by the center of the infinite circle; as Formal Cause, by the diameter; and as Final Cause, by the circumference.[55] The point, which symbolizes God as the Efficient Cause of all things, is indivisible and non-extended. The line, the surface, and the sphere, each partake in some measure of this indivisibility. "Everything, therefore, that is found in a material substance is nothing but a point or a resemblance of that unity."[56] "Unity or the monad is simpler than the point."[57] Hence it is of great importance, the Cardinal concludes, "that we look back to the smallest when we seek the largest."[58]

In the writings of some of the greatest mathematicians, we find evidence that they did not isolate their mathematical thinking from their religious thinking. A few quotations from the Harmonices Mundi of John Kepler (1571-1630) will show his attitude toward the question here under discussion. "For geometry," he says, "of which the two first books embrace the part regarding this, co-eternal with God and shining in the divine mind, furnished God with the plans, as was said in the preamble of this book, for adorning the world that it might be made the best and most beautiful, and, in short, most like to the Creator. For truly there are as many images of God, the Creator, as there are spirits, souls, minds, that have been placed severally over their own bodies that they might

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[54] Jacobi, p. 23.
[55] Cf. Jacobi, p. 25.
[56] Uebinger. Philos. Jahrbu. 1897, p. 151.
[57] *Op. cit.*, p. 151.
[58] *Op. cit.*, p. 151.

govern, move, enlarge, preserve, and in fine, propagate them."[59] And again he says: "Concerning the symbolism of the Most Holy Trinity in the figure of a sphere, I have written in difference places, in Optics, and in my Commentaries on Mars, and this I wish to repeat here, in the science of the sphere. It comes to this, then: Suppose a point moves from the sphere's center to a single point on the surface of the sphere. The result will be a radius. The making of this straight line reveals the first principles of creation, and suggests the eternal generation of the Son. For a sphere is nothing but the prolongation of infinite points from a center to infinite points on the entire surface, making infinite lines, which in all respects are absolutely equal. In this, it symbolizes the eternal generation of the Son. A radius is no less the fundamental of a corporeal body. If we suppose a line pulled sidewise, it suggests a corporeal body, since it creates a plane. If a sphere be cut by a plane, the cross-section shows a circle. This circle is a true image of our mind, which has been created to rule the body. For this circle is to the sphere, as our mind is to the Divine Mind; namely, as a line to a surface, both being circular. With reference to the plane in which it lies. the circle is related as is the curve to the straight line, figures that are incommunicable and incommensurable. The circle, which is the beautiful creation of the secting-plane, appears both in the plane and in the bisected sphere, by reason of the interrelation of the two. So is the soul in the body. The soul both gives form to the body and coheres to its corporeal shape, and also remains in God; as if, so to speak, it were a radiation derived from the Divine Countenance and given to the body, communicating thereby to the body a nobler dignity. The very fact that it is God who establishes the circle in harmonious relations with the source and origin of its limits, calls for the greatest possible abstraction; because neither in a circle of definite quantity, nor in an imperfect circle (such as material circles appreciable by the senses) can there be an image of the Divine Soul. Furthermore and principally, if we can regard a curved line (the symbol of the soul) as

[59] Astronomi Opera Omnia Ed. Frisch, Frankfurt a. M. 1864, Vol. V, p. 136.

something separated and, as it were, abstracted from a straight line (the symbol of the body), surely we may conceive a circle independent of the corporeal and perceptible. We are therefore sufficiently justified in this: that in harmonious proportions presented to the mind only, we should aim above all to view them as abstract quantities"[60]

Sir Isaac Newton, after demonstrating the mathematical principles according to which the heavenly bodies move in their respective orbits, makes the following reflection: "This most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being. . . .

"This Being governs all things, not as the soul of the world, but as Lord over all; . . . And from his true dominion it follows that the true God is a living, intelligent, and powerful Being; and, from his other perfections, that he is supreme, or most perfect. He is eternal and infinite, omnipotent and omniscient; that is, his duration reaches from eternity to eternity; his presence from infinity to infinity; he governs all things, and knows all things that are or can be done."[61]

The tendency discernible in most of the present-day literature bearing on the teaching of elementary geometry, is towards making it more real, more full of meaning and power, and for this reason connecting it with things that are real in the child's life and showing its bearings on the various phases of life's activities. G. St. L. Carson says: "It is for the teacher to determine the realities of his pupils and exemplify mathematical principles by as many as are suitable for the purpose. He will also find it necessary to enlarge their spheres of reality."[62] Though Carson makes no mention here of spiritual realities which exemplify or are exemplified by these same mathematical principles, yet he believes that modern mathematics will be to the social sciences what it has been to the physical sciences.[63]

This same thought was expressed by C. J. Keyser before

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[60] *Op. cit.*, p. 223.

[61] "The Math. Prin. of Nat. Phil.," tr. by Motte, A. London, 1803, Vol. II, pp. 310-311.

[62] "Mathematical Education." London, 1913, p. 37.

[63] Cf. *Op. cit.*, p. 51.

an assembly of several mathematical and scientific societies. Over and above the logical foundations and innumerable applications of mathematics, he places their "bearings upon the higher concerns of man as man—those interests, namely, which have impelled him to seek, over and above the needs of raiment and shelter and food, some inner adjustment of life to the poignant limitations of life in our world and which have thus drawn him to manifold forms of wisdom, not only to mathematics and natural science, but also to literature and philosophy, to religion and art, and theories of righteousness."[64] Some of these bearings are then indicated in particular in the continuous search of man for something constant. For "man's lot is cast in a world where nought abides. The universal impermanence of things, the inevitableness of decay, the mocking frustration of deepest yearnings and fondest dreams, all this has been keenly realized wherever men and women have had seeing eyes or been even a little touched with the malady of meditation, and everywhere in the literature of power is heard the cry of the mournful truth."[65] Man seeks "some ageless form of reality, some everlasting vantage-ground or rock to stand upon, some haven of refuge from the all-devouring transformations of the weltering sea. And so it is that our human aims, aspirations, and toils thus find their highest unity—their only intelligible unity—in the spirit's quest of a stable world, in its endless search for some mode or form of reality that is at once infinite, changeless, eternal."[66] The things of sense cannot quench this thirst, and the things of the mind, Keyser tells us, all "aim at rescuing man from 'the blind hurry of the universe from vanity to vanity': they seek cosmic stability—a world of abiding worth, where the broken promises of hope shall be healed and infinite aspiration shall cease to be mocked."[67] It is naught else but the old cry of St. Augustine re-echoed in the twentieth century, and made more poignant and restless by the materialistic and agnostic tendencies of the age. What mathematics does to aid the human

[64] "The Human Worth of Rigorous Thinking." New York, 1916, pp. 44-45.
[65] *Ibid.*, p. 46.
[66] *Ibid.*, p. 47.
[67] *Ibid.*, p. 50.

spirit in its search for the unchangeable, is to offer the mind a world of ideas unvarying and eternal; to show the mind its intellectual freedom; to help the mind to understand a divine Being infinite and eternal, to bring home to it the "reverend saying attributed to Plato that 'God is a geometrician.'"[68] It is in the field of infinitude and invariance "that Theology may find, if she will, the clearest conceptions, the noblest symbols, the most inspiring intimations, the most illuminating illustrations, and the surest guarantees of the object of her teaching and her quest, an Eternal Being, unchanging in the midst of the universal flux."[69]

These and similar passages show that the mathematical world of thought is not entirely segregated from the spiritual world, and whatever exception might be taken with regard to the superlatives in the last quotation, a little thought will show the direction to be correct. In his address[70] to the Michigan School Masters' Club in 1912, J. C. Keyser shows briefly the relation of some of the larger concepts of higher mathematics to life, and emphasizes the fact that these same concepts are found in the elements of mathematics as well. The variable and the constant, the limit and the function which are there touched upon, will be expanded somewhat in the last section of this paper.

(To be Continued)

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[68] Cf. *ibid.*, p. 58-60, for the three contributions named.
[69] *Ibid.*, p. 312.
[70] Printed in EDUCATIONAL REVIEW, Sept., 1912. Vol. 44, 2, pp. 140-156.

HARTLEY COLERIDGE

"An utter visionary, like the moon among thin clouds, he moves in a circle of light of his own making." Such was Samuel Taylor Coleridge's account of the infancy of his child Hartley, whose life was dreamful and ineffectual, as his poetry was misted with moonbeams. Together with the infirmity of purpose which marked his famous father, he inherited also some of his golden gift of numbers. For he, too, was to have his "shaping spirit of imagination," and the magic which comes through the gates of dream was destined in turn to touch his life, and to soften with its kindly aura the sordidness of his lot, and the harshness of circumstance.

Few children show so rich an endowment of genius, or such perilous gifts of temperament as did little Hartley. The circumstances of his early life were calculated at once to foster these talents, and to deepen his natural sensibility. The surroundings of Keswick in the English Lake district to which he came in 1800 to reside with his parents at Greta Hall, Southey's home, were an ideal environment for the future poet. It was then the scene of utter loveliness and seclusion which Gray has sketched for us in his journal, or De Quincey in his reminiscences. On one side lay the lake of Bassenthwaite, and the towering masses of Skiddaw; on the other the lake of Derwentwater, "the deep serene of its waters, and the long shadows of the mountains thrown across them," the sounding cataract of Lodore, and the superb gorge of Borrowdale. Add to this the fact that he was educated, as his brother Derwent testifies, "by desultory reading, by the living voice of Coleridge, Southey and Wordsworth, Lloyd, Wilson and De Quincey; by daily recurring hours of solitude—by lonely wanderings with the murmur of the Brathay in his ear"—and you have some measure of the formative influences which inspired him. To these natural and cultural charms of his locale little Hartley's personality was exquisitely keyed. The comely boy's face, with its dark, dreamy eyes and weak benignity of features, which looks out on us from Sir David Wilkie's portrait of him, has an expression of wistfulness, and breathes the sensitive spirit of the visionary. His shyness, intensified by a physical deformity which debarred him from boy's pastimes, sought an escape from life into the world of

day-dreams with the creatures of his imaginings. The unhealthy subjectivism thus developed in him was ever after to hold him in thrall.

Meantime Hartley grew up in the gentle society of his sister, Sarah Coleridge, and her companions, Edith Southey and Dora Wordsworth, and under the immediate tutelage of his father. Even then a hint of his besetting peccancy and penitent good-nature is contained in the lines of a pathetic record: "High were his hopes of me, for his love was strong, and finding an understanding and creative spirit in me, ready tears, repentance close upon offense, and simple notions of the nature of ill, he never thought the heart could be wrong." Later, after some years of classical training at local schools, he in 1815 entered Oxford as Scholar of Merton. There the promise of a career, marked by brilliant intellectual gifts and conversational qualities which made him much sought after in social circles, was marred by the waywardness that wrecked his life. After winning the Oriel fellowship he was ignominiously "sent down" for intemperance. He returned in disgrace to the Lake District, where the rest of his life was passed in aimless idleness until his release by death in 1849.

During all these years of vagabondage Hartley lived mostly at Grasmere, or at Nabb Cottage, near Ambleside, upon the hospitality of others. To the peasant folk he was much endeared as "li'l Hartley" because of the guileless humanity, and social charm which were constant in him. His foibles appealed to them, as his poetic gifts won their ready admiration. He was the special intimate of the children of the district whom, like Goldsmith, he amused by playing the "Tortossy Cat," or by reciting his nonsense verses. If he was a constant worshiper at "Wytheburn's modest house of prayer," he was also too often the boon companion of the country topers who revelled at the "Red Lion" tavern. Yet despite his irregularities, he preserved through all a vein of unaffected piety, and a never-failing penitence followed upon his many lapses into self-indulgence. The process of demoralization, however, left its imprint indelibly upon him, and could easily be traced in the change from the sweet face of the engaging English lad, "exquisitely wild," to the sorry figure of one

"Untimely old, irreverendly gray."

A quaint, misshapen little man in doubtful habiliments, with uncertain gait and flighty ways, his head generally on one side, his large, coal-black eyes shining in contrast with his white hair—such in mien and semblance was the Hartley Coleridge of later life. Today he sleeps peacefully with Wordsworth, whose protégé he was, near St. Oswald's Church, Grasmere, in a quiet unbroken save by the sound of the murmuring Rotha as it whispers by.

Hartley Coleridge's poems are among the most personal in all poetry. So faithfully do they reflect every mood of his mobile nature that they may be said to present his very *figura animi*. They are notable for the gift of fantasy with which he touches the common currency of his experience into the fairy gold of song. Beautiful ideas seem to have been breathed into his mind unceasingly, as if coming to him from the mountain breezes, or welling up from unfailing founts within. In words of exquisite rightness and melody he hymns his love for the sights and sounds of Nature, and all the wee sentient things of earth—birds, and animals, and children. The fauna and flora of Lakeland are the objects of his loving concern, and are worthily celebrated in his verse. Perhaps he is at his happiest in his *genre* pictures of the Seasons when his mood of meditative tenderness is attuned to some tone or temper of the landscape, as in the charming "November":

> The mellow year is hasting to its close;
> The little birds have almost sung their last,
> Their small notes twitter in the dreary blast—
> That shrill-piped harbinger of early snows;
> The patient beauty of the scentless rose,
> Oft with the morn's hoar crystal quaintly glassed,
> Hangs, a pale mourner for the summer past,
> And makes a little summer where it grows:
> In the chill sunbeam of the faint, brief day
> The dusky waters shudder as they shine.
> The russet leaves obstruct the straggling way
> Of oozy brooks, which no deep banks define,
> And the gaunt woods in ragged, scant array,
> Wrap their old limbs with sombre ivy twine.

His sentiment overflows into all the still-growing things of Nature, and dowers them with conscious life. In his verse the daisy, the cowslip, the celandine, the snowdrop, the forget-me-not, the lily of the valley, take on personality, and become

like Herrick's "maids of honour who do bring in the Spring." Of their human sisters he is the devoted Poet Laureate, and he wreathes his choicest lyrics in their honor. His lines to Louise Claude, those to a lofty beauty from her poor kinsman, and the stanzas beginning "She was a queen of noble Nature's crowning" express the old-world gallantry with which he pays his devoir at lady's bower. The exquisite song, "She is not fair to outward view," included in the "Golden Treasury," will serve alone to keep his memory green in English letters.

It is, however, in his sonnets that he has attained most of all to self-revelation. They are the proper medium of expression for his faculty of wavering speculation, and his tearful self-communings. In them he shows himself the subtle analyst of his soul's malady—his forwardness of purpose and human sinfulness, or he seeks respite from his woes by viewing reality through the magic glass of phantasy. Of these the most touching are the sonnets beginning with the lines, "Let me not deem that I was made in vain," and "Long time a child, and still a child," etc., and a third, "Once I was young and fancy was my all." From such instances of forlorn meditation he turns in others to celebrate the appeal of youth and beauty, the spell of music, or the amenities of Nature with which his lot was cheered. One noble sonnet, "Multum Dilexit," memorable for its note of simple faith and penitence, so characteristic of him, may here be quoted as the fitting envoi to his poems:

She sat and wept beside His feet; the weight
  Of sin oppress'd her heart; for all the blame,
  And the poor malice of the worldly shame,
To her was past, extinct, and out of date,
Only the *sin* remain'd—the leprous state;
  She would be melted by the heat of love,
  By fires far fiercer than are blown to prove
And purge the silver ore adulterate.
  She sat and wept, and with her untress'd hair
    Still wiped the feet she was so blest to touch;
  And He wiped off the soiling of despair
    From her sweet soul, because she loved so much.
  I am a sinner, full of doubts and fears,
  Make me a humble thing of love and tears.

F. MOYNIHAN.

THE CURRICULUM OF THE CATHOLIC ELEMENTARY SCHOOL.* A DISCUSSION OF ITS PSYCHOLOGICAL AND SOCIAL FOUNDATIONS.

By George Johnson

(*Continued*)

SUBJECT MATTER AND THE INDIVIDUAL

In the last chapter we have noted the modern tendency to regard education as exclusively a means of social control and to make the good of society its principal aim. This is in line with the current social philosophy, which regards the group as of paramount importance and considers the individual only in relation to the group. Individual rights and duties are measured by social norms on the assumption that the individual exists for society. A further inference identifies society with the State and makes the State the all-powerful arbiter of individual destiny. The trend of modern legislation, even in spite of the fact that the late war has demonstrated the peril of allowing governments to become too strong, shows how practical this philosophy has become.

Catholic philosophy has ever maintained that Society exists for the individual. The economy of salvation dictates this view: that the individual may save his soul and come to his appointed destiny, union with God, the world was created and the Redemption effected. Society, and its organized sovereign will, the State, are means of salvation. They are the temporal concomitants of Divine Grace and are intended to so dispose temporal things that the individual may the better devote himself to things spiritual. Man has other interests, other allegiances, than the merely civil, because he has a higher destiny than the merely natural. He must render to Caesar the things that are Caesar's, but there are more important things in his life over which Caesar has no control. St. Thomas points out that "man is not subservient to the civil community to the extent of his whole self, all that he is and all that he has."[144] The Pagans deified the State and worshipped the emperor as a god. The blood of the martyrs was poured out in protest against this system and the Church has ever jealously guarded the rights of the individual against undue encroachments on the part

*A dissertation submitted to the faculty of philosophy of the Catholic University of America in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

[144] St. Thomas, "Summa Theologica." *Prima-Secundae*, Qu. XXI, a. 4, ad 3.

of the State. We recall the glorious work of Gregory VII, in this connection. The philosophy of the Church is very simple. Temporal things exist for the sake of the eternal. The temporal elements of man's life are regulated by society through the State. They represent a lower order and are of a consequence bound to serve that which is higher. They exist as a means, not an end. The end of the group is to provide the best conditions for the individual to work out his eternal destiny, to save his immortal soul.[145]

This does not imply that the individual has no reciprocal relations to the group. Whilst it is true that the group exists for the individual, it is quite as true that the individual cannot attain his destiny without the group. Society exists because it answers man's primal instinct to associate.[146] The child needs the family, the family needs the community, the community needs the State. "The need for the existence of the State with its array of soldiers, constables and tax-gatherers, rests on three grounds: first, the natural sociability of men, or their desire of living together; secondly, their endowment by their Creator with various rights; thirdly, their moral and intellectual imperfections."[147] The individual requires the cooperation of the group in all that he desires to accomplish. In return for such cooperation he must make surrenders of his own will and impulse. This is all included under the law of Christian charity, which postulates that he love his neighbor as himself.

Now social reform and social betterment is a Christian duty, for the difficulty of saving one's soul increases according as the evils of temporal life rise up to impede and discourage us. Moreover, it is inconsonant with the ideal of Christian justice, that oppression and exploitation of the weak by the strong should pursue their way unhindered and unrebuked. But social reform must begin with the individual. There are certain improvements which can be effected by legislating from above, but they will be but empty and transitory if corresponding reforms are not attempted from below. The quality of a group depends upon what the individuals composing it think and feel and do. Consequently the best ultimate way of improving society and bringing it up to the level of high ideals is to improve the individual.

[145] Sertillanges, A. D., *La Politique Chretienne.* Paris, 1904, p. 39.
[146] Leo XIII, *Encyclical, Immortale Dei.* "The Great Encyclical Letters of Pope Leo XIII." New York, 1903, p. 108.
[147] Devas, Charles Stanton, *Political Economy.* New York, 1901, p. 571.

The educational corollary of all this is that the real function of education is the improvement of the individual. Practical education is necessary, but it is not the sole essential. "There is danger that in swinging from the extreme that produced men with an education without a vocation, we will swing to the other extreme that will produce men with a vocation without an education."[148] We need workers, but we need men more. The prime function of education is to make those differences in the thought and action of the individual that, summed up, spell character. Thus, on the one hand, will be saved the principle of individual integrity, while, on the other, the needs of society will be consulted and true social reform effected.

Education which has for its aim the improvement of the individual, sometimes goes under the name of education for culture, though the term may have an invidious meaning for some because of a narrow interpretation of the word, culture. This aspect of the question will be taken up later; for the present we will confine ourselves to a discussion of the means of achieving individual culture.

Here we are face to face with one of the greatest problems of education. All great educators in all times have implicitly, if not explicitly, maintained that real education is impossible without so disciplining the mind as to make it a fit instrument for the uses of life. This concept is found in Greek education,[149] and persists throughout the ages. But the question is, how shall this discipline be secured? How shall the mind be developed and strengthened so as to attain that power in which discipline consists? How shall the objective elements of learning be ordered and used so as to make the desired subjective differences? What is the function of subject matter? Is it to be of value in itself, or shall it be chosen solely with a view to discipline?

Here we uncover the whole controversy concerning formal discipline. Its history has already been sufficiently indicated for an understanding of its present status. Today, we are in the throes of a reaction against the theory. The needs of society, as outlined in the last chapter, are demanding a new type of subject-matter, practical in character and having a direct bearing on the needs of life. The schools have been loth to accept this material, because it is supposed to lack cultural value. Both parties have gone to wide

[148] Joyner, James W., *National Educational Association Proceedings*, 1916, p. 81.

[149] Graves, F. P., *History of Education*. New York, 1909, Vol. I, p. 189.

extremes. The advocates of culture and discipline maintain that the chief value of subject-matter is psychological and that its function is to develop and train the mind. This it can accomplish better if it is not practical in character, for it should deal with values that are transcendent and laws which are general and demand a certain kind of effort which alone can educate. The prophets of the practical claim that it is a waste of time to force children to learn things whose practical advantage they cannot appreciate and in which they are not interested except for external reasons. Disciplinary education, they maintain, is merely a matter of mental gymnastics and is advanced as an excuse for its own manifest failures. For experience shows that most of the knowledge that is acquired in the name of discipline is soon lost and fails to leave tangible trace. In explanation of this fact, a mystical kind of general competency is claimed, some sort of power of soul that will function in any exigency.

The opponents of the theory of formal discipline appeal to psychology in confirmation of their position. They maintain that the theory is based on a misconception of the nature of the mind, the doctrine of mental faculties, according to which the soul is made up of certain definite powers or faculties, the most important of which are cognition, feeling and conation. These constitute the principal sources of mental activity and in them are included such subordinate faculties as memory, imagination, reason, perception, attention, etc.[150] Modern psychology no longer seriously entertains this opinion, for "it is false and would be useless to human welfare if true."[151]

Now the division of the mind into faculties is as old as psychology itself. The moment that men began to study the mind, there was a necessity for classification. Even a rude classification has its use, for it is the beginning of science. The study of consciousness at once reveals the existence of some elements that very greatly resemble one another, and others that differ completely. These resemblances and differences are the basis of classification. One of the earliest divisions was that into reason, will and desire.[152] With Plato each of these divisions constitutes something very much

[150] Ackermann, Edward, *Die Formale Bildung, eine Psychologisch-Pädagogische Betrachtung.* Langensalza, 1898, p. 2.
[151] Thorndyke, Edward L., *Educational Psychology, Briefer Course.* New York, 1914, p. 72.
[152] Klemm, Otto, *The History of Psychology,* Wilm and Pintner Translation. New York, 1914, p. 48.

like a special soul. Aristotle maintained that there is one vital principle (ψυχή) endowed with five genera of faculties, the division being based on the five stages of biological development. There is the vegetative faculty which is concerned with the needs of organic life; the locomotive faculty which presides over movement; the faculty of sense perception, including sensation and imagination; the appetite, or tendency to good; and finally, reason.[153]

The Scholastics followed Aristotle's division. According to Scholastic doctrine, body and soul are united in one complete substance; the soul, the substantial form, being the principle and source of all activities, biological and physiological as well as psychological. St. Thomas makes a greater distinction than did Aristotle, between sensuous appetite and rational appetite, or will.[154] The soul is the substance, the faculties accidents. There are cognitive capabilities of the sensuous order, the intellect, or faculty of rational knowledge, and two kinds of appetite. The feelings or emotions are complex products, made up of cognitive and appetitive elements, or mere aspects of such energies.[155]

John Locke substituted the notion of power for faculty and was the first to urge against the concept of faculty, the objections which are current today. Leibniz advanced the theory of actual tendencies and his lead was followed by Christian Wolff (1679–1754). Wolff held that the "vis representativa" is the fundamental power of the soul. This it is that transforms the powers or possibilities of the soul, the faculties, into actualities. The faculties, at first mere possibilities, become attributes of the soul and bear the same relation to the mind as the bodily organs to the body. He distinguishes four faculties, cognition, desire, sense and reason. Each of these faculties has enough of intelligence about it to cooperate with the others.[156] This notion is no doubt responsible for much of the misunderstanding prevalent today and for the extremes taken by the opponents of faculty psychology.

The faculty of feeling was added by Tetens, (1736–1805) who proposed a new pair of fundamental faculties, receptivity and activity. The first included feeling, the second, the various activities of the will, inner as well as outer.[157] Thus was originated

[153] Klemm, Otto, *The History of Psychology*, p. 48. Also Maher, Michael, *Psychology, Empirical and Rational*. New York, 1915 (Eighth Edition), p. 33.
[154] St. Thomas, *Summa Theologica*. Pars Prima, Qu. 80, a. 2.
[155] Maher, Michael, *Psychology—Empirical and Rational*, p. 84.
[156] Klemm, Otto, *The History of Psychology*, p. 60.
[157] *Ibid.*, p. 62.

the tripartite division into feeling, cognition and will, a division adopted by Kant and most psychologists since his time.

The turning point in the history of faculty psychology came with Herbart who proposed two objections to Kant's notion. (1) Mental faculties are mere class concepts derived by process of abstraction. (2) They are nothing more than possibilities and are not found among the facts of inner experience. In the content of actual experience, we distinguish ideas, but not a faculty of ideation, particular feelings, not a faculty of feeling, remembrances, not a faculty of memory. Herbart substituted the notion of power which differs from faculty in the respect that it arises as a necessary result of appropriate conditions.[158]

As a result of Herbart's criticism modern psychologists do not recognize the faculty. The mind is no longer regarded as a unity operating by means of certain capabilities and powers, but rather as a bundle of tendencies to react in a definite way to definite situations. Man comes into the world with a fairly well organized system of tendencies to feel and act. These tendencies respond to the physiological organization of the neurones. A neurone, apart from education, will transmit a stimulus to the neurone with which it is by nature most closely connected. This is the basis of the reflexes and instincts, or what are known as unlearned tendencies. The mind is by nature sensitive to a certain situation; it responds to this situation naturally and unconsciously, because a bond exists between the situation and the response.

Now in the course of experience, some of these bonds are strengthened through the operation of the Law of Use. That is to say, if a man responds originally to a situation, the connection between the situation, S, and the response, R, will be strengthened. If on the other hand, the connection is not made for any length of time between S and R, the bond will be weakened. This is the Law of Disuse. These laws are sometimes combined under the name of Law of Exercise. Furthermore, if satisfaction results from the making of a response, the S–R bond will be strengthened; if annoyance results, it will be weakened. This is the Law of Effect.[159] It is the function of education to supply the proper experiences or situations and to observe the Laws of Exercise and Effect in calling forth the right responses. Education then becomes a matter of modifying native S–R bonds and building up

[158] *Ibid.*, p. 66.
[159] Thorndyke, Edward L., *Educational Psychology, Briefer Course*, p. 70.

new ones. This is the educational psychology of Edward L. Thorndyke, of Columbia University. It is accepted by a great number of writers on modern pedagogy and is the basis of most of the work done at Teachers College, Columbia University.

Of course, there is no room in this psychology for the doctrine of formal discipline. Education is a matter of forming appropriate S–R bonds and these bonds are always more or less specific. They demand a definite response to a definite situation. There is no such thing as training the judgment, though there is training of specific judgments. The memory is not cultivated, but children are trained to remember certain things. "And so with all the other mental and moral virtues. They are not general, but obstinately particular. What, then, is the net result of all this? What but that we must abandon all talk and claim of general mind-forming, and gladly accept the more humble task of mind-informing. The several studies provide not opportunities for general training, but each of them its own peculiar opportunities for special training."[160]

Yet the discrediting of the faculty psychology has not served to down effectually the doctrine of formal discipline. Concessions may be made as to its extreme form. Practical experience and daily observation prove that training in mathematical reasoning does not necessarily make for power to reason well in other lines. Men of strong will and dogged determination in affairs of business and state, only too often show a sorry lack of will power in ruling their own passions. Yet to say that training in one direction has absolutely no influence in any other direction contradicts the most obvious results of education. Schooling, in whatever line, does seem to make some difference in the way a man conducts himself in other lines. General education cannot be a myth entirely. Modern experimental psychology, weary of *a priori* attempts to settle the problem, has turned to experiment with the result that we have an illuminating and rather considerable literature on the subject of transfer of training.[161]

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[160] Moore, Ernest Carroll, *What is Education?* Boston, 1915, p. 102.

[161] Good general accounts of these experiments are found in Colvin, Stephen S., *The Learning Process.* New York, 1915. Bagley, William Chandler, *Educational Values.* New York, 1915. Freeman, Frank N., *How Children Learn.* Boston, 1917.

A more detailed and classified description is contained in Hewins, Nellie P., *The Doctrine of Formal Discipline in the Light of Experimental Investigation.* Baltimore, 1916; *Educational Psychology Monograph,* No. 16.

The experiments made to date may be divided according to the aims of the investigators into those which are primarily psychological and those which are primarily pedagogical.[162] Among the psychological experiments, there are: 1. Those which attempt to determine the effect of one kind of sensitiveness on other kinds of sensitiveness. Best known are the tests of Thorndyke and Woodworth and those of Coover and Angell. The former attempted to determine the influence of training in estimating magnitudes of the same general sort on ability to estimate similar magnitudes, such as lines of various lengths, areas of different sizes, and weights of different degree. They also tested the "influence of training in observing words containing certain combinations of letters or some other characteristic, on the general ability to observe words."[163] They concluded that it is misleading to speak of sense discrimination, attention, memory, observation, etc., since these words refer to multitudinous individual functions; that improvement in any single mental function rarely brings about equal improvement in any other function; that where such improvement seems to occur, it is due to the fact that there were identical elements in the practice series and the final test series. Two kinds of identity are always involved, identity of substance and identity of procedure. The former constitutes the objective element in transfer, the latter, the subjective element. The subjective element is personal and is dependent upon the quality of the individual mind and its interests; it includes methods of learning, attitudes and dispositions.[164]

Coover and Angell attempted experiments in discrimination, for the purpose of determining the effect of special exercises on general practice.[165] Subjects were practiced in discriminating intensities of sound and then tested for ability to discriminate shades of grey. In a second experiment, the effects of training in sorting cards was noted on "typewriter reactions," or ability to react properly on the typewriter when certain letters were exposed.

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[162] Hewins, Nellie P., *The Doctrine of Formal Discipline in the Light of Experimental Investigation*, p. 4.

[163] Thorndyke, E. L. and Woodworth, R. S., "Improvement in Mental Functions." *Psychological Review*, Vol. VIII, pp. 247–261; 384–395; 553–564.

[164] Thorndyke, Edward L., *Educational Psychology*. New York, 1913, Vol. II.; *The Psychology of Learning*, Ch. XII.

[165] Coover, J. E. and Angell, Frank, "General Practice Effect of Special Exercise." *American Journal of Psychology*, Vol. XVIII, 1907, pp. 328–340.

Transfer was noted and the authors concluded from test and introspection that this was not due to identical elements, but to the fact that the subjects formed a habit of divesting the process of all unessential features and attending only to the essential. Thus Coover and Angell subscribe to the doctrine of transfer. They are supported by the experiments of Wallin, Seashore and Jenner, and Urbantschitsch. Thorndyke and Woodworth disagree.

2. Experiments on the accuracy of voluntary effort and the effect of special training on the general rapidity and accuracy of motor adjustments. These experiments have not produced a great amount of evidence either for or against transfer. The subjects were too few in number and the practice too much like the tests to warrant any trustworthy conclusions.[166]

3. Experiments of the effect of special training on the general rapidity and accuracy of memorizing. The pioneer test of this kind was that made by James, who tested the capacity of five subjects to memorize poetry after training and compared it with their capacity before training. He concluded against improvement and claimed that memory could not be improved but that "all improvement of memory consists in the improvement of one's habitual method of recording facts." The experiments lacked the technique and scientific character that would be necessary to give them validity, yet because of the prestige of their author they were quite widely accepted at the time.[167]

A more scientific experiment was that conducted by Ebert and Meumann. Training tests in memorizing series of letters, nonsense syllables, words, Italian words, strophes of poetry and selections of prose produced improvement in memory. They concluded that there must be "a sympathetic interaction of allied memory functions based on assumed psycho-physical activity."[168] Although critics of the experiment hold that the sole cause of the improvement was the increased power of attention, improvement of technique, etc., which the authors list as auxiliary causes, the opinion of the investigators, because of the manner in which the tests were conducted, is worthy of respectful attention. The findings of Bennett and Fracker likewise argue in favor of spread.[169]

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[166] Hewins, Nellie P., *The Doctrine of Formal Discipline in the Light of Experimental Investigation*, pp. 15–25.
[167] James, William, *Principles of Psychology*. New York, 1890, Vol. I, p. 666.
[168] Meumann, E., *The Psychology of Learning*, Ch. III. New York, 1913.
[169] Hewins, Nellie P., *The Doctrine of Formal Discipline in the Light of Experimental Investigation*, pp. 25–28.

4. Experiments to test the training of one organ upon the bilaterally symmetrical one, or upon a closely related member. Eight investigations have been made along this line by Davis, Scripture, Raif, Wallin, Volkmann, Swift, Starch and Woodworth. Tests were made with the hands, fingers, arms, toes and eyes; no experiment was made upon the ears. In every case transfer was found, although a variety of explanations was advanced.[170]

The pedagogical experiments have been conducted in the fields of mathematics, spelling, English grammar and in the examination of the effects of training on mental traits, like: memory, habits, concentration of attention, observation, quickness, accuracy, etc., ideas of method and ideals. Rietz and Shade studied the correlation between the grades of children in the various branches of the curriculum.[171] They hoped to discover the existence of reciprocal relations that would have an effect upon transfer. Using the methods of Galton and Pearson, they found a high correlation between mathematics and foreign languages. No transfer was indicated, but inasmuch as there is a high correlation between these branches, there is at least some probability of transfer.

Winch prosecuted a study of the accuracy of school children,[172] and after finding a high positive correlation between accuracy in working simple sums and ability in solving arithmetical problems, felt that there was not enough evidence in the practice tests which he conducted simultaneously to argue for transfer of training. Accuracy in working sums does not necessarily make for accuracy in reasoning. He concludes: "It seems to be possible to find highly correlated functions which appear to have very little relationship of a pedagogical value. We cannot conclude without further inquiry in other lines, that two highly correlated mental powers are causally related."

Bagley supervised an experiment at the Montana State Normal College for the purpose of discovering whether the habit of producing neat papers in arithmetic would produce habits of neatness in other branches. He failed to find the slightest improvement in

[170] *Ibid.*, pp. 28–31.

[171] Rietz and Shade, *Correlation of Efficiency in Mathematics and Efficiency in other Subjects.* University of Illinois, University Studies, Vol. III, No. 1. November, 1908.

[172] Winch, W. H., "Does Improvement in Numerical Accuracy Transfer?" *Journal of Educational Psychology*, Vol. I, 1910, pp. 557–589; Vol. II, 1911, pp. 262–271.

language and spelling papers, though there was marked improvement in the arithmetic papers.[173] He suggested that the failure to secure transfer was due to the fact that the habit of neatness had not been made a conscious ideal in the minds of the children. This was followed out by Ruediger, who found that when the ideal was made conscious, transfer was achieved. "In general, the value of specific habits under a change of condition, depends directly on the presence of a general idea, which would serve for their control."[174]

This conclusion was further emphasized by Judd in his experiment on the effect of practice as determined by the knowledge of results.[175] A number of children were required to attempt to hit with a small dart, a target which was placed under 12 inches of water. It was found that when one group was instructed as to the deflection of light through refraction, they were more successful when the depth of the target was increased to 4 feet than were another and uninstructed group. The knowledge of conditions gave an idea of method which resulted in transfer.

Dallenbach experimented on the concentration of attention. His problem was to find the effect of a daily drill of fifteen minutes on charts of numbers, letters, words, geometrical figures, etc., conducted during a period of seventeen weeks. A striking rise in the school grades of the children resulted during the following school term. He concluded that the evidence justified a restricted belief in formal discipline.[176]

It remains to note the experiment made by Dr. Hewins, in her capacity as Instructor in Biology at Newton High School, New York City. Dr. Hewins felt that more enlightening results might be obtained if investigators would work with children in their formative years, rather than with adults in psychological laboratories. For the ordinary conditions of transfer are present before habits are formed and the mind has lost much of its plasticity. She chose as her field the study of the effects of training on the powers of observation, largely because she could thus pursue the

[173] Bagley, William Chandler, *The Educative Process*. New York, 1917, p. 208.

[174] Ruediger, W. C., "The Indirect Improvement of Mental Functions through Ideals." *Educational Review*, Vol. XXXVI, 1908, pp. 364–371.

[175] Angell, Pillsbury and Judd, "The Doctrine of Formal Discipline in the Light of the Principles of General Psychology." *Educational Review*, Vol. XXXVI, June, 1908, pp. 1–42.

[176] Dallenbach, K. M., "The Effect of Practice upon Visual Apprehension in School Children." *Educational Psychology*, Vol. VI, pp. 321–334; Vol. VII, pp. 387–404.

experiment in her own class-room. The subjects of the experiment were pupils, boys and girls, in the first term of their Freshman year at High School. Their ages varied from twelve to seventeen. Three series of tests were given, the first daily from April 22 to April 30; the second, from June 3 to June 11; the third, from November 4 to November 11. The practice series was given on ten school days from May 15–28. The practice series consisted of observation of biological material, which was exposed to the children, who were then allowed ten minutes to write a description. In every case the material consisted of a flower—the lilac, the dogwood, the buttercup, etc. The test series included some biological and some non-biological material. The latter consisted of pictures, syllables, nonsense figures, geometrical figures and figures in the air. These were exposed to the children and they were given a certain time to write a description. The aim was to discover if the practice in observing the biological material of the practice series would improve the observation of the biological material of the test series, and particularly of the non-biological.

The experiment was carried out carefully, due allowance being made for all contributory causes. One-half of the class were practiced. The results show an improvement of the practiced half over the unpracticed in the test series, both in the biological and non-biological material. "It is evident from these general summaries and comparisons that the practiced pupils have done better in the second and third series than the unpracticed. The question difficult to solve is: 'What is the cause?' No doubt growth, familiarity with procedure, benefits of class-work and study, and desire to excel, have all contributed their share toward the gain, but these factors may have aided both sides equally. We have no means of telling. Then why the difference?"

"Feeling that the balance of arguments and scientific proofs were against formal discipline when this investigation was begun, I am forced by the results obtained to admit that in this experiment, the proof seems to be on the affirmative side."[177]

The significant fact about all these experiments, and many others which we might mention, is that all without exception show that some transfer is possible. Of course, the fact of transfer

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[177] Hewins, Nellie, P., *The Doctrine of Formal Discipline in the Light of Experimental Evidence*, p. 112. Part II, pp. 49–144, contains a complete account of the experiment with tabulated results.

is ascribed to other causes, such as method in recording facts (James), the functioning of identical elements (Thorndyke), etc. But even granting that these factors contribute, it remains undeniable that there is such a thing as transfer. The explanations advanced might well serve as the basis of further discussion; meanwhile they serve to throw light on educational method. The findings of James and Thorndyke, which by the way bear some evidence of having been fitted into preconceived notions, were too readily accepted by some schoolmen. The result has been the specific-training idea, which threatens to involve us in a situation where real culture will be sacrificed to narrow specialized efficiency.

The argument against the dogma of formal discipline which is based on the discrediting of the faculty psychology is an empty one and lacks anything like conclusiveness. First of all, if the faculty theory is rightly understood it is not as absurd as is generally implied. Every science classifies the phenomena with which it has to work, and psychology in its study of consciousness will arrive nowhere should it fail to note the likenesses and differences in conscious phenomena. Again, mental states are complex and they cannot be properly understood unless they are analyzed. Such analysis is bound to discover certain primary modes and activities that cannot be further reduced and which for want of a better word, we may call faculties. The mistake comes when psychology advances too ready an opinion as to the nature of these faculties. The question is profoundly metaphysical; it touches on the question of the nature of the soul and its relations as a substance. Crude attempts at expression have resulted in a too material concept of a highly spiritual fact. A faculty is nothing more than the mind's capability for performing a particular kind of activity. There are real differences in psychical activity; this is evident from a consideration of the diversity of the objects toward which the such activity is directed. The mind's reaction to color differs profoundly from its reaction to reasoned argument. This difference of reaction to different stimuli is an index of a difference of mode in activity. A faculty is a mode of mental activity which is different from any other mode of mental activity.[178]

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[178] Maher, Michael, *Psychology, Empirical and Rational*, pp. 23–40. Also *Catholic Encyclopedia*, "Faculties of the Soul," Vol. V, p. 740, and St. Thomas, *Summa Theologica*, Pars Prima, Qu. 77, art. 3.

A CATHOLIC CLASSICAL CONFERENCE

At a meeting of a number of Catholic educators, presided over by Bishop Shahan and held in Chicago, November 5, 1919, a movement was set on foot to form a Catholic Classical Association, the purpose of which would be to guard the welfare of Latin and Greek studies in Catholic schools, and not allow them to go the way they have been going in non-Catholic institutions.

A committee was appointed to make the final plans for a special classical conference, at which would be discussed such topics as might come under the general headings, "What can be done to preserve the study of the classics," and "What can be done to improve the teaching of the classics."

At a meeting of this committee held in Cleveland, December 8, 1919, the final plans for the Classical Conference were made.

The first Catholic Classical Conference will be held on Tuesday of Easter Week, April 6, at Hotel Hollenden, Cleveland, Ohio.

The program of the conference will be divided into two parts, each consisting of three papers, besides a short introductory talk by Bishop Shahan.

The first part of the program will be held in the morning, and the meeting will be called at 11 o'clock. The papers at this session will deal in general with the means of preserving the classics in our educational system. The subjects of these papers and their writers are:

1. What is being done outside Catholic circles for the promotion of Classical Studies. Dr. Deferrari, Catholic University of America.

2. The ideal training of the teacher of the classics. Father McNichols, Marquette University.

3. Classical propaganda. Dr. Pace, Catholic University of America.

The second part of the program will be held at a luncheon in Hotel Hollenden. This will consist of three papers dealing in a general way with "How to improve the teaching of the Classics." The subjects of these papers and their writers are:

1. The teaching of first-year Latin and Greek. Father Jepson.

2. Classical authors in high school. Father Plassman, St. Bonaventure's College.

3. Insistence on the literary spirit in college courses. Father Pernin, Loyola University.

The permanent organization and status of the Catholic Classical Association will be determined at this meeting, as well as the way of affiliating itself with the great non-Catholic movement, the Classical League.

All in any way interested in the welfare of classical studies are invited and urged to attend this conference.

ROY J. DEFERRARI,
Secretary of the Committee.

THE TEACHER OF ENGLISH

"WRITING FOR THE PAPERS"

The daily press of their home city is a source of opportunity in connection with their work which very few teachers of English ever utilize.

In the metropolitan areas the great papers contain endless varieties of topics which could with real advantage be made vital and interesting subjects for work in oral and other kinds of composition. These days there is so much news that the papers are pressed for space in which to print it all. And most of it is not murders, divorces, and fresh scandals. It is live matter both for the present hour and for the future. It would supply themes of actual flesh and blood for work in oral composition, and should serve ultimately to invigorate the anemic and vapid character of much of the conversation one has to endure in the average company.

In the rural, and semi-rural, communities, the local papers could profitably be approached on the subject of giving space to the best work of the pupils in the local schools, and a healthy interest in good newspapers and newspaper work should be fostered among the pupils by encouraging them to "get into print." There are text-books on journalism which will give the interested teacher, whether her classes be the grades or the high school or the college, many an illuminating suggestion on this score which her own ingenuity should have little difficulty in developing.

Try it! T. Q. B.

NOTES

That much-discussed problem, the influence of war on national life and literature, is taken up from a somewhat new angle by Mr. Howells in the "Editor's Easy Chair," appearing in the January *Harper's Magazine*. Arguing that comparatively similar causes and conditions may be expected to produce similar results, Mr. Howells gives a vividly reminiscent picture of the years immediately following the Civil War, contrasting that anxious period with the years through which we are living now. Happily the domestic problems and trials of one generation are forgotten by the next, and yet one cannot help feeling a sort of shame-faced pleasure upon reading that

with the conclusion of the Civil War, fifty-five years ago, "people went about with preposterous rents in their hands seeking roofs to cover their heads," with the result (how familiar it sounds!) that "the old-fashioned houses of the time were let in apartments, and it might well happen that the floor of some New York brown-stone dwelling once the home of a single family, had become the refuge of a grateful tenant at a rent of five thousand dollars a year." Then there were the high prices in the necessaries of life other than rents, prices largely due to the fact that a gold dollar was worth nearly three dollars in the paper currency. Thus, an overcoat might cost a hundred dollars, and "all kinds of provisions were atrociously dear, though it will hardly surprise the housekeeper of our day to learn that the beefsteak of that day was forty cents a pound, and that eggs were sometimes sixty cents a dozen, but the high cost of living will best appear from the fact that steak afterward fell to twenty cents and eggs to eighteen cents on the resumption of specie payment." To our sordid mode of thought, this part of Mr. Howells' analogy is by far the most interesting. If prices of necessities will only decline, we can endure whatever the future holds in the way of literature!

An authorized biography of Grover Cleveland is being prepared by Professor Robert M. McElroy, of Princeton University, which will be published by Harper and Brothers. Many of President Cleveland's letters were written by hand and no copies were kept. Professor McElroy, and Harper & Brothers, have issued an appeal to all who had correspondence with Mr. Cleveland to permit the use of his letters.

Great authors are not always recognized by their contemporaries. It usually needs a later generation than his own rightly to estimate a man's real value either in art or literature. We will not know the great authors the war has produced until they are no longer with us. But we do know that there has been a great awakening of interest in literature since the war came to an end, and this interest has tended in the main toward books that are less trivial in character, more vital in purpose than formerly. In fiction we look for a genuine real-

ism, for stories involving matters of high import both in the individual and the national life. In poetry, clever imitation gives place to originality. Books and magazines are full of verse that, for novelty of form and substance, would scarce have gained a hearing a decade ago. It is too early to decide what is intrinsically worth while, lasting, in literary innovations of this kind; that they have found their way into our current reading, and not without a frequently generous welcome, gives ample indication, to say the least, of the intellectual eagerness, hospitality of this after-the-war period. The great commanding figure in contemporary literature may not be in sight. But the stage is magnificently set for his coming, and it is quite possible that he has already made his entrance from some back wing obscured for the moment by the throng standing between him and the footlights.—*New York Times.*

Something is wrong with fiction. We are all, declares a writer of it, agreed upon that. "If you who read have lost interest," this novelist anonymously confesses in *Harper's Magazine,* "we who write are in a much sadder plight. For we can no longer beguile you, because we ourselves are no longer beguiled." Why? Is it the war? No, replies this anonymous authority. Never has the market been so good. Never have editors offered such tempting sums for stories. Never has there been such good material for the fictionist; never before so many interesting things to write about. He finally comes to this conclusion:

"A novel, as well as a picture, should have its perspective, so that the farther away we stand from it the more unified it becomes, the more its details compose themselves into the whole. And when we have accomplished that, we shall have taken fiction out of the realm of propaganda and argument into which it has strayed, and restored it once again to the realm in which it belongs, and in which alone it can serve—the realm of pure art.

"For this our novels will be short. We must learn brevity. At least if a novel is long, let it be because it has a long story to tell. We must take more time to the writing of our novels in order that they may take less time to read. That is our task, which we must not shirk if our books are to be read at all. Not, however, as we so often hear, because in this buying age people have so little time to read. They have, as a matter of

fact, more time, since the processes of life have been so much simplified. But they are more exacting, more impatient of futile discursiveness, of maundering narrative that gets nowhere. They have learned the value of time and do not like wasting it. They do not propose to do our segregation for us. They will no longer dig through our shirkings to uncover our climaxes and our points. We must make clear what we mean. And to do this we must follow the lead of the other arts and use what the modern painters have come to use—clear color, pure line and mass. Or learn from the modern musician, who says what he has to say and leaves it, whether you like it or not. Far better than the old way of saying what people liked and then embroidering, repeating, going over it until every one ended by hating it."

Mrs. Henry Mills Alden requests that anyone having letters of interest from Henry Mills Alden, the late editor for so many years of *Harper's Magazine*, send them to her in care of Harper and Brothers for use in the writing of his biography.

Difficulty with grammar means usually: (1) Uninspired teaching, (2) wrong methods, (3) a dull brain, or dull eye, or dull ear, and a pupil who needs personal analysis more than sentence analysis; (4) adverse environment. Whichever of these is the reason, or whichever combination of these, the only way to correct the poor grammar which results is to remove the cause first. Numbers (1) and (2) can only be corrected from within the teacher. Number (3) can only be corrected from within the child by outside influence. Number (4) is a high obstacle which cannot easily be surmounted. It is either a problem in Americanization or a problem in tact, or both. It presents a real problem to many a teacher, and the measure of her success in solving it will be the measure of her personal influence, skill, and strength of purpose.

As regards slang, it were always well to remember that there is a slang of the library or drawing room, as well as the slang of the street and of the gutter. Shakespeare put "beat it" into the mouth of one of his elegant ladies in "The Comedy of Errors," a while ago; and Shakespeare is in many respects a really liberal and safe precedent!

THOMAS QUINN BEESLEY.

EDUCATIONAL NOTES

THE EDUCATIONAL EMERGENCY AND ITS SOLUTION[1]

Today we face an emergency—educational and social—which is not only going to put the democracy we fought to win, save, and perpetuate, on trial, but which in many ways is going to test the power to endure of even civilization itself. It will not be solved by statesmen, politicians, financiers, labor leaders, nor agitators. It will not be solved by the present generation of citizens, who will be able only to make temporary settlements which will serve as experiments. The real solution will not, and cannot, come until some of these experiments are made and evaluated by a people trained to think in the light of new ideals of service and social values.

The responsibility, then, for the solution of the many problems of reconstruction rests with the teachers of the next decade. Never was such a responsibility placed upon any class in any society, and how unprepared they are to undertake it has been repeatedly shown during the last four years. If this emergency is to be met and civilization enabled not only to endure but to progress, it can not be done by immature, unprepared and underpaid teachers. These conditions will be removed when a united teaching profession can bring an interested informed public to demand the highest degree of educational efficiency, and as the essential to that efficiency, to provide for every teacher a living and a saving wage.

1. The present educational emergency is traceable in practically all of its aspects to the insufficient salaries paid to teachers throughout the country.

2. The cost of living has more than doubled in the last three years, while the increases in teachers' salaries for the United States in the same time has been about 12 per cent. As a consequence, nearly half the teachers of the country are compelled to spend more than their salaries.

3. Teachers, as well as other salaried workers, have not had their salaries increased in anything like the same degree that other workers have. Consequently, teachers are constantly

[1]Supplement, January *N. E. A. Bulletin*, 1920.

being forced to a lower standard of living and a resulting lower standard of efficiency, because they cannot meet the higher demands for rent, food, clothing, books, etc.

4. From various studies of budgets for many occupations in relation to the cost of living, it is estimated that a minimal salary of $1,200 should be established for the entire country, and paid on the basis of twelve months. Too many teachers are living below the margin of efficiency. Hundreds of them returned their questionnaires annotated with remarks such as: "I work in a drug store during summer," "I do housework for my room and board," "I take in sewing to meet expenses," "My summer expenses are paid by my family." "I can't save enough money to go to summer school."

5. Teachers are paid much less than the members of other professions—ministry, law, medicine, engineering, etc. The median salaries are not only larger, but the range of salaries is very much greater, thus offering more promise to the capable, the hard-working and the ambitious individual in the professions. This is lacking in teaching.

6. Teachers are paid much less than a great many of the unskilled laborers whose preparation is very much shorter, and whose expenses for "professional upkeep" are very much less. Existing salaries paid to teachers can be said to almost place a penalty upon adequate preparation, since there is no opportunity for an adequate return upon the investment of time and money necessary to the securing of that preparation.

7. A teacher's work is most effectively done when she is in good health, free from worry, able to participate in the community activities, and when she has the social respect of the community. These things make her a leader, a moulder of citizens, a creator of ideals, and yet practically all these elements of success are denied a majority of teachers by the insufficient salaries paid.

8. New York City, which pays relatively high salaries when compared with other cities, in reality pays its teachers no better than the workers in many of the unskilled occupations.

9. The study of the salaries of the 2,015 draft registrants shows that there is in other lines of work an increase in salary

in direct relation to an increase in age, and also in relation to the increase in the amount of schooling received.

10. The additional salary received per year of increased age is much less than the additional salary received per added year of schooling.

11. Occupations which demand additional preparation, with the exception of teaching, received higher median salaries than those where education beyond the elementary schools is not essential.

Of the 600,000 public school teachers in the United States it has been estimated by competent authorities that:

200,000 have had less than four years' training beyond the eighth grade;

300,000 have had no special professional preparation for the work of teaching;

150,000 are not beyond 21 years old;

65,000 are teaching on permits, not being able to meet the minimum requirements of county superintendents;

143,000 dropped out of the profession in 1919.

Of the 20,000,000 children of the United States 10,000,000 are being taught by teachers who have had no special preparation for their work and whose general education is clearly inadequate.

As a necessary requisite for improving standards, teachers' salaries must be increased and placed on a living and saving basis.

WHO PUT "SHUN" IN EDUCATION?

Too small salaries is not entirely to blame for the present shortage of teachers, is stated by the Institute for Public Service in its bulletin today, "Who Put Shun in Education?" as other fields of work paying less than teaching have not lost their lure.

Who Did It?

1. *Too small salaries did it*—much of it—*but by no means all of it,* for no channels of education are being shunned more than those that lead to highest paid positions; and other fields which even now pay less than teaching, like social work, have not lost their lure.

2. *Competitors did it*—much of it—but again not all of it, for boys and girls shun teaching who do not yet know of its competitors.

3. *Standarditis—perverted use of standard measurements—did it*—lots of it—by taking out of teaching much more than it gave, for it too often squelches a spirit which uniformity and standards without spirit cannot replace.

4. *Supervision*—by principal, superintendent, special supervisor, state officers—did it—too much is of too little helpfulness, the kind that puts a premium on acting like "a monkey on the stick."

5. *Course of study* did it.

6. *Too much text-book* did it.

7. *Summer schools* did it, by taking thousands of the best ability away from recreation, health and life to reading and listening and apeing.

8. *"Professional training"* did it by shifting emphasis from teacher growth to exploration of subject-matter.

9. *History of education, mistaught and mispictured,* did it by turning energies from present needs to past philosophies.

10. *Educational psychology, unimaginatively taught,* did it by such questions as were given last summer at Teachers' College, Columbia, to superintendents and principals: "What are the implications of a fountain pen?" "If a mad dog were running rapidly toward you would the experiential alternatives be of equal value?"

11. *Courses in administration* did it—oodles of it—by miseducating ought-to-be leaders and helpers in the art of substituting medians for meditation and average imitating for courageous leading. At Teachers College last summer strong administrators spent their time reading—as *they might have done at home—six hours a day* where six minutes of own-problem-analysis would have done vastly more.

12. *"Leading educators"* did it by leading away from freedom and initiative, by substituting exploitation for leadership, and by fostering obsequiousness among younger men as the price of advancement.

13. *Educational politics* did it by rapping the knuckles of originality and independence and pampering compliance.

14. *Foundations* did it—how very much of it few realize or try to find out—by chloroforming inquiry, self-dependence, variation, by substituting the supple knee for the supple mind.

15. *N. E. A.* did it—by treating the proletariat of teachers like so many pawns or like Russian followers of self-selected dictators—by low efficiency of annual meetings—and by lower efficiency in war time leadership. Will you help President Preston get us back to the main track?

16. *Educational journalism* did it by playing up to devastating forces instead of exposing them and by featuring tail lights and dummy headlights.

17. ?

18. ?

19. ?

20. *Lack of adventure* did it—according to Winship—one of the principal factors, and one directly due to the foregoing doers.

One hundred million dollars more for education and medical research by Mr. Rockefeller. Have you personally thought what might be done? Try this with the next group of brainy people you match your wits with: (1) List all the separate high spot ideas and practices in education which they owe to Rockefeller gifts; (2) List additional benefits which those gifts might have accomplished if differently directed; (3) List any probable dis-services or disadvantages to American education which are traceable to Rockefeller giving and education's attitude toward it.

GOVERNMENT POSITIONS IN OCCUPATIONAL THERAPY

The United States Civil Service Commission has announced examinations for field supervisor of reconstruction aides in occupational therapy, at $1,800 a year; superintendent of aides in occupational therapy, at $2,400 a year; special instructor in occupational therapy, at salaries ranging from $1,200 to $3,500 a year, and reconstruction aides, at salaries from $720 to $960 a year. Reconstruction aides will also receive quarters, subsistence and laundry. Appointees to all positions whose compensation does not exceed $2,500 a year will receive the increase of $20 a month granted by Congress if their services prove satisfactory. In all about 500 positions in the Public Health Service throughout the United States, and at St.

Elizabeth's Hospital (insane), Washington, D. C., will be filled.

The examinations for field supervisor of reconstruction aides and superintendent of aides will be held on February 24. The other examinations will be open until further notice. Both men and women, if qualified, will be admitted, but appointing officers have the legal right to specify the sex desired when requesting certification of eligibles.

None of the examinations requires competitors to assemble in an examination room for tests. The ratings will be based upon the elements of education, training and experience and upon a written discussion on one of a number of given topics connected with the work.

Further information and application blanks may be obtained from the representative of the Civil Service Commission at the postoffice or custom house in any important city, or by communicating with the United States Civil Service Commission, Washington, D. C.

AMERICAN SCHOOL CITIZENSHIP LEAGUE

Object.—To develop an American citizenship which will promote a responsible world democracy and a real cooperation among the nations.

Prize Essay Contest.—Two sets of prizes, to be known as the Seabury Prizes, are offered for the best essays on one of the following subjects:

1. Education for Citizenship in the League of Nations. Open to Seniors in Normal Schools.

2. The Most Effective Method of Securing Cooperation as against Competition between Nations. Open to Seniors in Secondary Schools.

Judges.—Miss Sarah Louise Arnold, Dean, Simmons College, Boston, Mass.; J. Montgomery Gambrill, Department of History, Teachers College, Columbia University, New York City; E. L. Hendricks, President, Central Missouri State Teachers College, Warrensburg, Mo.; Miss Mabel Hill, Dana Hall, Wellesley, Mass.; Albert J. Roberts, Principal, High School, Helena, Mont.; William S. Sutton, Dean, Department of Education, University of Texas, Austin, Tex.

Contest closes March 15, 1920.

Conditions of the Contest.—Essays must not exceed 5,000 words (a length of 3,000 words is suggested as desirable), and must be written, preferably in typewriting, on one side only of paper, 8 x 10 inches, with a margin of at least 1¼ inches. Manuscripts not easily legible will not be considered.

The name of the writer must not appear on the essay, which should be accompanied by a letter giving the writer's name, school, and home address, and sent to Mrs. Fannie Fern Andrews, Secretary, American School Citizenship League, 405 Marlborough Street, Boston, Mass., not later than March 15, 1920. Essays should be mailed flat (not rolled).

The award of the prizes will be made at the annual meeting of the League in July, 1920.

Information concerning literature on the subject may be obtained from the secretary.

Last year, in view of the universal interest in the subject, many principals introduced the contest as a part of the regular school work. This year we are asking all schools to do this, and the best essay in each school should be sent for submission to our judges.

Moments with the Consoling Christ. Prayers selected from Thomas À. Kempis by Rev. John A. Dillon, LL.D., with Foreword by Rt. Rev. John O'Connor, D.D. New York: Schwartz, Kirwin and Fauss, 1918. Pp. vi+159.

Hamilton's Essentials of Arithmetic, First Book, by Samuel Hamilton, Ph.D., LL.D., Superintendent of Schools, Allegheny County, Pa. New York: American Book Co., 1919. First Book, 368 pages; Second Book, 436 pages.

Book I covers the work to be taught in the second, third, fourth and fifth years. Book II is intended for the sixth, seventh and eighth grades.

Efforts are being made on all sides today to modify the content of the arithmetic taught in the school by excluding useless and impracticable matter and attempting to correlate whatever is taught in arithmetic with the general content of the child's consciousness so as to secure in this way added interest. The author of this series is evidently striving to accomplish the work in this direction. How well he has succeeded must be determined by those who will use his books. Whether the verdict shall be favorable or not will not prevent us from accepting as legitimate the aims which the author proposes to himself in the writing of these books. These aims are set forth in his preface as follows:

"The two important ends sought in the teaching of arithmetic are: (1) to give the pupil such a mastery of number combinations and processes as will enable him to perform with accuracy and speed all common numerical operations; and (2) to train him in the skilful application of these processes to the problems that he is likely to meet in his daily experiences. This series has aimed to lay equal stress on both these important phases of arithmetic." The only question in the teacher's mind as he examines these books is whether or not the means employed by the author for the attainment of the two specified ends are likely to prove adequate. That they are good as far as they go will readily be admitted by most teachers: "The frequent drills in numbers in their ab-

stract relations develop habits of accuracy and speed. The motivation of the drill work, especially in the earlier grades, is secured by means of interesting number games.

"The problems have been framed with a view to the pupils' interests. At first they deal entirely with his life at home, at school, on the street, and in the playground; but gradually they reach out to include his contact with the larger phases of social and industrial life. The problems are of two types: first, the isolated problems, which provide direct application of a principle to some need or experience of the pupil; and, second, groups of related problems, called 'Everyday Use of Numbers,' which centers about an idea or a situation in which the pupil feels a vital interest. These related problems serve as a review of various principles previously taught. The problems are all real because they are true to life. They carefully avoid impractical conditions and all questions that have no relation to common experience.

"The pupil's self-activity is utilized in constructive work and in the framing of original problems. His initiative is exercised by leading him to discover many arithmetical truths for himself. The importance of the correct interpretation of problems and the choice of the best method for their solution is emphasized."

Correlated Mathematics for Junior Colleges, by Ernest R. Breslich, Head of the Department of Mathematics in the University High School, University of Chicago. Chicago: Chicago University Press, 1919. Pp. xiv+301.

The teaching of mathematics in our schools has long suffered for want of proper correlation. Little attempt was made to correlate the work in the mathematics class with the other branches of the curriculum which were being pursued by the pupil. This naturally led to isolation and sterility, but the mischief did not end here—the parts of the field of mathematics were kept rigidly apart and frequently totally isolated in their treatment. The child finished addition before he had begun to study subtraction and on finishing subtraction he began multiplication, etc. Fractions was an entirely new world and decimals was another continent. In like manner, we still find many high schools completing the study of algebra

before taking up geometry, etc. In the present series of high-school and college mathematics, close correlation of the various branches of mathematics has been maintained, "when, as in these texts, mathematical material from all branches is so organized that the things studied at each level of maturity are the materials best adapted to this stage that are available in any of the branches, the organization that best prepares for the next advance is the best organization, whether the student actually makes the advance or not."

Applied Arithmetic—The Three Essentials, by N. J. Lennes, B. S. and S., Ph.D., Professor of Mathematics, University of Montana, and Frances Jenkins, Professor of Elementary Education, University of Cincinnati, and Supervisor of Elementary Grades in Cincinnati. Philadelphia: J. B. Lippincott Co., 1919. Pp. xi+283.

This, the first of a three-book series, is intended to cover the work in arithmetic in the second, third and fourth grades.

An attempt is made, in this first book of the series, to correlate the subject-matter of the arithmetic drills with the children's actual experience. "The authors believe in these books the elementary facts of arithmetic are derived from situations which are within the range of experience of nearly all normal children." The correlation of the various fundamental operations is also attempted. Numerous suggestions are offered to making of problems by the children. These suggestions, if carried out, will add vitality to the work. As to the motivation, the authors have this to say: "The subject-matter of arithmetic can be motivated most effectively only when the freest possible use is made of the child's many spontaneous interests. The authors have not neglected any opportunity that has occurred to them to interest the child in the subject-matter itself and its manifold applications. They have recognized, however, that it is possible to connect the learning of arithmetic with other activities which in themselves are of compelling interest to the child, that the combination will be a source of joy and life when the arithmetic elements alone would lead to sadness and forced labor. For this reason systematic use has been made of games, of group competition and many similar games."